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NOTES ON THE DISTRIBUTION OF THE PLEURODONTE SINUATA GROUP

BY P. W. JARVIS.

Jamaican Pleurodontæ fall into two distinct groups: those that have two teeth on the peristome, with *P. acuta* as type (see last article), and the four-toothed species, with *P. sinuata* and *peracuteissima* as types.

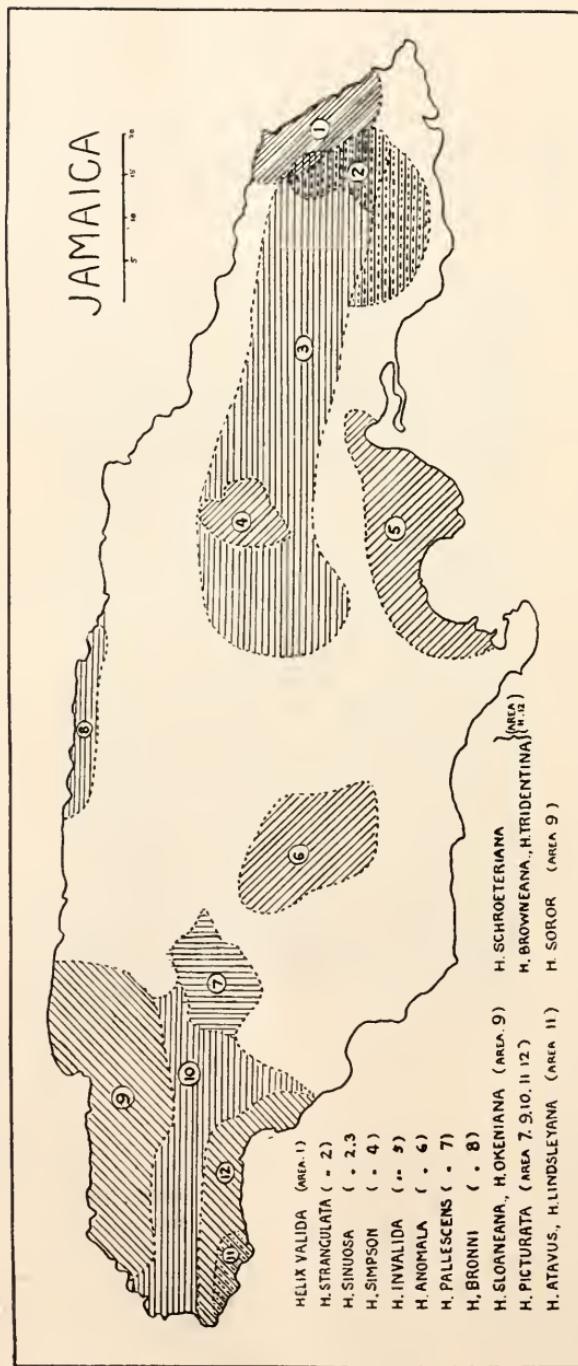
The species of this second group are :

1. <i>P. valida</i> (Ads.).	11. <i>P. picturata</i> (Ads.).
2. <i>P. strangulata</i> (Ads.).	12. <i>P. atavus</i> (Sh.).
3. <i>P. sinuosa</i> (Fer.).	13. <i>P. lindsleyana</i> (Chitty).
4. <i>P. simpson</i> (Pfr.).	14. <i>P. schroeteriana</i> (Pfr.).
5. <i>P. invalida</i> (Ads.).	15. <i>P. tridentina</i> (Fer.).
6. <i>P. anomala</i> (Pfr.).	16. <i>P. browniana</i> (Pfr.).
7. <i>P. pallescens</i> (Sh.).	17. <i>P. sinuata</i> (Müll.).
8. <i>P. bronni</i> (Pfr.).	18. <i>P. soror</i> (Fer.).
9. <i>P. sloaneana</i> (Sh.).	19. <i>P. peracuteissima</i> (Ads.).
10. <i>P. okeneana</i> (Pfr.).	20. <i>P. cara</i> (Ads.).

Pleurodonte valida (Ads.) (No. 1 in map), John Crow Mountains, in the extreme east of the island. This common woodland species is very abundant in the north and eastern parts of this area.¹

Pleurodonte strangulata (Ads.) (Area No. 2), not a common shell, though rather widely distributed. The remarkable shape of the aperture at once distinguishes it from its allies.

¹ Specimens of *P. valida* were taken near Hope Bay by C. W. Johnson and W. J. Fox, in 1891.



Pleurodonte sinuosa (Fer.) (Area No. 3). Common on the mountains in the eastern half of the island; often found from 2,000 to 3,000 feet above sea level.

Pleurodonte simpson (Pfr.) (Area No. 4). If this is not a good species, it is the small globose local form of *H. sinuata* found in the Richmond Valley district, where it abounds to the exclusion of the other forms of *sinuata*.

Pleurodonte invalida (Ads.) (Area No. 5) is limited to the lowlands of St. Catherine and common all over this district, even in the wooded swamps near the sea. It is found in company with the var. *sublucerna* of *acuta*, and possibly is a diminutive or lowland variety of *H. sinuata*.

Pleurodonte anomala (Pfr.) (Area No. 6) is a very remarkable and readily distinguished species, limited to the Manchester district. The var. *convexa* of Adams occurs at Balaclava.

Pleurodonte pallescens (Sh.) (Area 7) is limited to the cock-pit country, and very common in the "sink-holes" at Mulgrave, in St. Elizabeth.

Pleurodonte bronni (Pfr.) (Area 8) is not a common shell, being limited to a few miles of the coast hills on the north side of the island, near Rio Bueno and St. Ann's Bay.

Pleurodonte sloaneana (Sh.) and *P. okeniana* (Pfr.) (Area 9) are both distributed throughout this area. *P. sloaneana* is very common and found living everywhere, whilst *P. okeniana* (the larger of the two species) is represented by dead shells alone in the southern and eastern parts of this area, and at present only found living at Hanover.

Pleurodonte picturata (Ads.) (Areas 7, 9, 10, 11, 12). This extremely pretty shell spreads from the cock-pit country through St. James, Hanover, Westmoreland and the western parts of St. Elizabeth. The var. A. of Adams with the more elevated spire and closed umbilicus, occurs in the western parts of Westmoreland and common near Negril.

Pleurodonte atavus (Sh.) (Area 11) is very local, limited to low coast hills lying west of Little London in Westmoreland, where it is far from abundant. The arrangement of the teeth on the peristome and general build of the shell at once distinguish it.

Pleurodonte lindsayana (Chitty) (Area 11). A few poor specimens of this shell come from the same locality as *P. atavus*. This

is also Chitty's type locality where he obtained a few good specimens.

Pleurodonte schroeteriana (Pfr.) (Area 12). This species abounds in the wood of the western part of Westmoreland, it occurs much less commonly in the other parts of this area.

Pleurodonte tridentina (Fer.) and *P. browniana* (Area 12) are found in the woods on the northern parts of this area, at a higher elevation than *P. schroeteriana*. These two species are allied to *P. schroeteriana*, and if not good species, the types are very highly differentiated varieties. These shells are also subject to considerable individual variation.

Pleurodonte sinuata (Müll.) is the only species of this group which is found almost all over the island. Slightly specialized local forms do occur, but it is remarkable that a shell so widely distributed and so abundant should be so constant.

Pleurodonte soror (Fer.) (Area 9). This shell occurs in the Parish of Hanover and the bordering mountains of Westmoreland.

Pleurodonte peracutissima (Ads.). This shell is generally distributed over the higher regions of Manchester, Clarendon, St. Ann, Trelawny and St. Elizabeth. In spite of this species being so widely distributed and varying very much in size, and other minor characters, there is little doubt as to the extreme varieties belonging to the same species. Several localities have their typical varieties of this species.

Pleurodonte cara (Ads.) inhabits the western part of the Island (the part shaded on the map), and a few stragglers have been found in the mountains on the north of Manchester and St. Elizabeth. There are two very distinct varieties of this shell, the type with the "very thick, strong lip" from St. James and Hanover, and the common and more widely distributed variety which is of a much lighter build and with thinner lip.

NOTICES OF NEW LAND SHELLS OF THE JAPANESE EMPIRE.

BY H. A. PILSBRY.

Eulota despecta var. *kikaiensis* n. var.

Smaller and more solid than *despecta*, pink-tinted, at least near the aperture; the cuticle thin or wanting, hardly yellowish. Inner

border of the lip more or less thickened, pink or lilac colored, the throat paler. Whorls 5 to $5\frac{1}{3}$.

Alt. 17, diam. 19 mm.

Alt. 15 to $15\frac{1}{2}$, diam. 17 mm.

Kikaiga-shima, Oshima group, Osumi.

The fossil specimens from Kikaiga-shima belong to the larger typical form, which also still exists in the living fauna of the island, practically indistinguishable from the Okinawa shells, and showing the same color variations, from brownish-pink to a whitish straw tint.

Punctum morseanum n. sp.

Shell umbilicate, depressed, convex, low conic above, convex beneath, thin, brownish-corneous. Surface slightly shining, nearly smooth, but there are a few irregular and low thread-like striae of growth. Whorls $3\frac{1}{2}$, convex, separated by a well-impressed suture, the last whorl rounded at the periphery, convex beneath. Aperture oblique, rounded, somewhat less than one-fourth of the circle excised at the parietal wall. Peristome simple and thin, the columellar margin dilated. Width of the umbilicus one-sixth the diameter of the shell. Alt. 0.73, diam. 1.9 mm.

Hirado, Hizen, in western Kyūshū. Types no. 83024 A. N. S. P., from no. 553b of Mr. Hirase's collection.

This species is much larger than *P. japonicum* Pils. It differs from *P. amblygona* (Reinh.) and its variety *pretiosum* (Gude) in the rounded periphery and smoother surface. *P. leptum* (Westerl.), described from Nagasaki, which is not known to me by specimens, is apparently different in its sculpture of delicate, crowded, cuticular lamellæ, and in the obtuse angulation of the last whorl.

Prof. E. S. Morse informs me that he has demonstrated the existence of the genus *Punctum* in Japan by examination of the jaw. The species he worked on has not been determined, but it may not unlikely prove to be *amblygona* Reinh., as that occurs in the region of Tokyo. The described Japanese species mentioned above I have referred to *Punctum* from their shell-characters only. All of them are extremely small.

Hirasea acuta n. sp. Shell solid, biconvex, acutely carinate at the periphery, densely and finely striate above, and decussated with fine spirals below; brown, paler or whitish around the perforation; whorls slightly over 4, flat, the last deflexed in front, contracted at

the mouth. Aperture small, acutely angular at the position of the keel; basal lip strengthened within by a strong, white, callous rib. Alt. $1\frac{1}{2}$, diam. $3\frac{1}{2}$ mm.

Imotoshima, Ogasawara (Mr. Y. Hirase).

Not quite so depressed as the slightly larger *H. acutissima*, and beautifully decussated beneath.

Mandarina mandarina var. *conus* n. var. Shell much elevated, the spire pyramidal, with obtuse apex. Nearly black brown, 2 or 3 early whorls reddish; sometimes with a pale patch at the middle of the base. Alt. 21, diam. 22 mm.

Imotoshima, Ogasawara (Mr. Hirase, no. 896).

Clausilia japonica var. *okinoshimana*, n. var. Larger than *japonica*, coarsely fold-striate, with fine spiral striæ visible in most of the interstices; whorls $11\frac{1}{2}$. Dark purplish-brown, with a yellowish border under the sutures on the middle whorls. Aperture, lamellæ and plicæ as in *C. japonica*. Length 31-34, diam. 7-8 mm.

Okinoshima, Tosa. Types no. 80846 coll. A. N. S. P., from no. 585 of Mr. Hirase's collection.

Distinguished by its large size, dark color and strongly developed sculpture. It is not, however, different from *japonica* in any important structural feature.

Microcystina yakuensis n. sp.

Shell imperforate, depressed, biconvex, thin, somewhat translucent, pale yellow, glossy and smooth. Spire low conoidal, composed of $4\frac{1}{2}$ convex, slowly increasing whorls separated by a well impressed suture. Last whorl rounded peripherally, convex beneath, impressed at the axis. Aperture lunate; peristome thin and fragile; columellar margin reflexed, somewhat thickened. Alt. 1.2, diam. 2.3 mm.

Yaku-shima. Types no. 83035, A. N. S. P., from no. 900 of Mr. Hirase's collection.

This species is a miniature of "*Macrochlamys*" *tanegashimæ*, of Tanega-shima and Satsuma.

Kaliella Okiana n. sp.

Shell subperforate, conic-depressed, thin, brownish, somewhat glossy, the upper surface slightly striatulate, base whorl glossy. Spirally striate. Spire conic, composed of 5 convex whorls, the last slightly angular in front, becoming rounded. Aperture lunate,

the lip single and thin, columellar margin suddenly dilated and reflexed at the axial insertion, a little thickened. Alt. 2.1, diam. 2.7 mm.

Hirado, Hizen. Types no. 82969 A. N. S. P., from no. 891 of Mr. Hirase's collection. Named for Mr. Oki, Mr. Hirase's correspondent in Hirado.

Kaliella hizenensis n. sp.

Shell minute, imperforate, depressed-conic, thin, yellowish, somewhat transparent. Surface sculptured with excessively minute, densely crowded radial striae above, nearly smooth beneath. Spire low-conic, composed of slightly more than 4 very convex, slowly increasing whorls, the last rounded at the periphery, convex beneath, impressed at the axis. Aperture oblique, rounded-lunate, the peristome thin and simple, dilated and reflexed at the columellar insertion. Alt. 1.4, diam. 1.9 mm.

Hirado, Hizen. Types no. 82970. A. N. S. P., from no. 892 of Mr. Hirase's collection.

This very small species, of which 10 specimens were sent, is somewhat like *K. pagoduloides*, but more depressed and not so large.

DESCRIPTION OF A NEW UNIO FROM TENNESSEE.

BY WM. A. MARSH, ALEDO, MERCER CO., ILLINOIS.

Quadrula Beauchampii n. sp. Pl. I, lower two figs.

Shell subtriangular, inflated over the umbones and beaks; shell very thick and solid, thicker before, beaks solid, raised and *incurved*, inequilateral, rounded before, obtusely angular behind, ligament short, thick, light brown, epidermis yellowish-brown, growth lines close and very prominent, almost sulcate. Shell compressed at the base, slightly flattened on the sides, umbonal slope rounded, posterior slope rather wide, with a dark impressed line from beaks to basal margin. Beak sculpture unknown. Cardinal teeth heavy and solid, rather compressed, corrugate and sulcate, lateral teeth short, thick and slightly curved. Anterior cicatrices small and deep, posterior cicatrices distinct and well impressed, shell cavity wide, cavity of beaks deep and obtusely angular, nacre white. Dimensions of an adult specimen: diam. 1.4, length 2.2, breadth 2.3 inches.

Hab.: Little Tennessee River, Tenn., Wm. U. Beauchamp, and Holston River, Tenn., Mrs. Geo. Andrews.

Remarks: I obtained three specimens from Wm. U. Beauchamp a number of years ago; afterwards Mrs. Geo. Andrews sent me several of them from Holston river, Tennessee.

They are near *globatus* Lea, but were too different to place with that species. In outline they are subtriangular, not spherical, and rounded like that species. They are more solid and heavy, and a larger species than *globatus*. They have a lighter colored epidermis, with closer growth lines, and the surface of the shell is rougher.

They need not be confounded with my *Andrewsii*, as they differ in outline, teeth and character of the rays, and are a very much larger species, and more solid and heavy.

They vary greatly in character of the rays; some are rayless, two have obscure maculations, while some have very obscure, indistinct rays. I name this shell after Wm. U. Beauchamp, who first sent me these shells, and who formerly was greatly interested in this family of shells.

Quadrula Andrewsae Marsh. Pl. I, upper two figs. NAUTILUS XV, p. 115.

PHOLAS TRUNCATA IN SALEM HARBOR.

BY EDWARD S. MORSE.

Pholas truncata, first described by Say in the Journal of the Academy of Natural Sciences, in 1822, with distribution indicated as southern, has been reported by others in Connecticut, Vineyard Sound and New Bedford Harbor. It has never to my knowledge been found north of Cape Cod. Lately Mr. J. J. Connor, connected with the Peabody Academy of Science, in digging for *Pholas crispata*, in Salem Harbor, Mass., found large numbers of another species, which proved to be *P. truncata*. They were found at extreme low-water mark in very hard, fine clay, in company with very small specimens of *P. crispata* and large specimens of *Petricola pholadiformis*. Many young of *P. truncata* were also found. The burrows of this species were very large, in some cases exceeding an inch in diameter. Prof. Verrill states that in Vineyard Sound they are found at all elevations between tides. In Salem harbor they appear only at low tide.

A NEW RISSOINA FROM CALIFORNIA.

BY PAUL BARTSCH.

Rissoina bakeri spec. nov.

Shell small, sub-diaphanous to milky white. Nuclear whorls two, quite large, with beveled shoulder, smooth. Later whorls well rounded, somewhat angulated about one-fourth below the summit, ornamented by about twelve to fourteen quite well developed axial ribs and a series of prominent axial striations, between them in the intercostal spaces, which are about four times as wide as the ribs; both ribs and striations extend from the summit of the whorls to the umbilical region, which is bordered by a basal fasciole. Sutures simple, well marked. Aperture large, very oblique, sub-oval, slightly notched at the posterior angle. Outer lip varicose.

The type, No. 130562, U. S. Natl. Museum collection, is from San Pedro, California. It has seven whorls (nucleus included), which measure: Long, 2.7 mm.; diam., 1.0 mm.

Other specimens examined were collected at White's Point and Pacific Beach, Cal., and San Martin Island, Lower Cal. One of these has as many as sixteen axial ribs. On some specimens these are quite prominent, while in a few individuals they are but feebly expressed.

This species is nearest related to *R. newcombei* Dall, differing from it in having the whorls more inflated, slightly angulated with much less conspicuous axial intercostal sculpture, and in having the base rather prolonged and provided with a much stronger fasciole.

The species is named after Dr. Fred. Baker, of San Diego, California, whose collecting at San Martin Island has largely increased the number of species known from that locality.

GENERAL NOTES.

At the March meeting of the Section on Conchology of the Brooklyn Institute of Arts and Sciences, two topics were discussed; *The Preparation and Care of Cabinet Specimens* and the genus *Nassa*. Under the first topic several very practical suggestions were made by Prof. R. Ellsworth Call, President of the Section, based upon his long experience in that work. The discussion of *Nassa* was illustrated by many specimens from the rich collection of Mr.

Charles A. Dayton, and also by the specimens in the Children's Museum, in which building the meetings are held.—FRANK H. AMES, *Secretary.*

ALBERT G. WETHERBY.¹

Professor Albert G. Wetherby was born in Pittsburg, Pa., in 1833. While yet a boy his parents removed to the vicinity of Cleveland. Here he obtained a rudimentary education, and afterwards went to college. After his graduation his time for several years was spent in farming in the summer and teaching a country school in winter. In 1861 he removed to Cincinnati, where he was appointed principal of the Woodburn public school. He filled this position with great acceptability during nine years; but his friends, recognizing his broad scholarship and his special fitness to teach the natural sciences, urged his appointment to a professorship in the Cincinnati University, and in 1870 he was elected to the chair of natural history. But as the University was new, and spending its money in new buildings and equipment, the chairs of geology and botany were added to his duties. Professor Wetherby was young, full of energy and enthusiasm, and during these six years of his university work accomplished more than mortal man should have attempted. But even if he had nerves of steel, he saw that he would soon break down under this overwork, and so he resigned to accept a more lucrative position in the business world.

Professor Wetherby was a born teacher, and some of his friends thought he made the mistake of his life in resigning his chair in the University to accept a business position. But the trustees had placed upon him burdens too heavy for one man to bear, and he was too conscientious a teacher to slight his work.

His enthusiasm for his favorite studies was contagious. No one could be in his society long without feeling the wonderful magnetic power of this man. On one of his excursions with his class in geology he penetrated the wild mountain region of South Carolina. Little did he then think that this region would be his future home; that he would spend his last years among these strange people, the

¹ The portrait is reproduced from the last photograph which he had taken and represents Prof. Wetherby at about fifty years of age.—EDITORS.

followers of Cromwell, who sought to hide from the wrath of Charles II. in these mountain fastnesses.

He resigned his position in the Cincinnati University to become the general manager of the American and European Investment Company, which position he held for two years.

In 1886 he was made manager of a large tract of timber and mineral lands belonging to the Roan Mt. Steel and Iron Co. This appointment compelled him to remove with his family to North Carolina. Here his home was located in one of the most beautiful valleys in the world, about 3000 feet above the sea level and surrounded with towering mountains. To one who was such a lover of nature this was an ideal place. Here surrounded by his interesting family he varied his other duties, which were many, by communion with nature.

His hospitality was unbounded, and his home was always open to friend or stranger and especially to any strolling naturalist, who was always sure of a hearty welcome from the professor and his estimable wife.

Professor Wetherby, while connected with the Cincinnati University, organized five expeditions for field work and study, in all of which the writer had the pleasure of being one of the party. As an organizer of a camping party he had no superior. He was a very companionable man, could tell a story, sing a song or play on his violin to drive away the blues, when the weather was unpropitious, and could cook a meal under the most unfavorable circumstances that would satisfy the most fastidious epicure.

The naturalist's best hunting grounds are generally far from the lines of civilization. No mountain roads, however impassable, or swollen streams, could turn him from his course. Difficulties which would appall ordinary men only seemed to stimulate his indomitable will power, which always carried him safely through.

Among his numerous friends in Cincinnati, perhaps none mourned his death more than those who shared with him the joys and hardships of camp life.

Professor Wetherby was taken sick Jan. 1st, with congestion of the lungs, at his home in Magnetic City, N. C. He seemed to slowly improve, when on Feb. 10 he was taken with sinking spells due to heart failure. He died Feb. 15, and was buried at Magnetic City, N. C., Feb. 18, 1902.

The following papers by Prof. Wetherby appeared in the Journal of Cincinnati Natural History Society, Vols. II to VI, and Vols. XVI and XVII: Descriptions of new fossils from the Cincinnati group; also from the Subcarboniferous. Descriptions of new species of crinoids from the Kaskaskia Group; also from the Subcarboniferous. Remarks on the genus *Pterocrinus*. Some notes on American land shells. Trenton rocks at High Bridge, Kentucky. Remarks on the Trenton limestone of Kentucky, with descriptions of new fossils. Geographical distribution of some fresh-water mollusks of North America. Descriptions of Crinoids from the subcarboniferous of Pulaski county Kentucky. Descriptions of new fossils from Lower Silurian and Subcarboniferous of Ohio and Kentucky. Notes on Trenton fossils of Mercer Co., Ky. Descriptions of new fossils from the Lower Silurian and Subcarboniferous rocks of Kentucky. Directions for collecting and preparing land and fresh-water shells. Relation of mollusks to shells. Natural history notes from North Carolina.

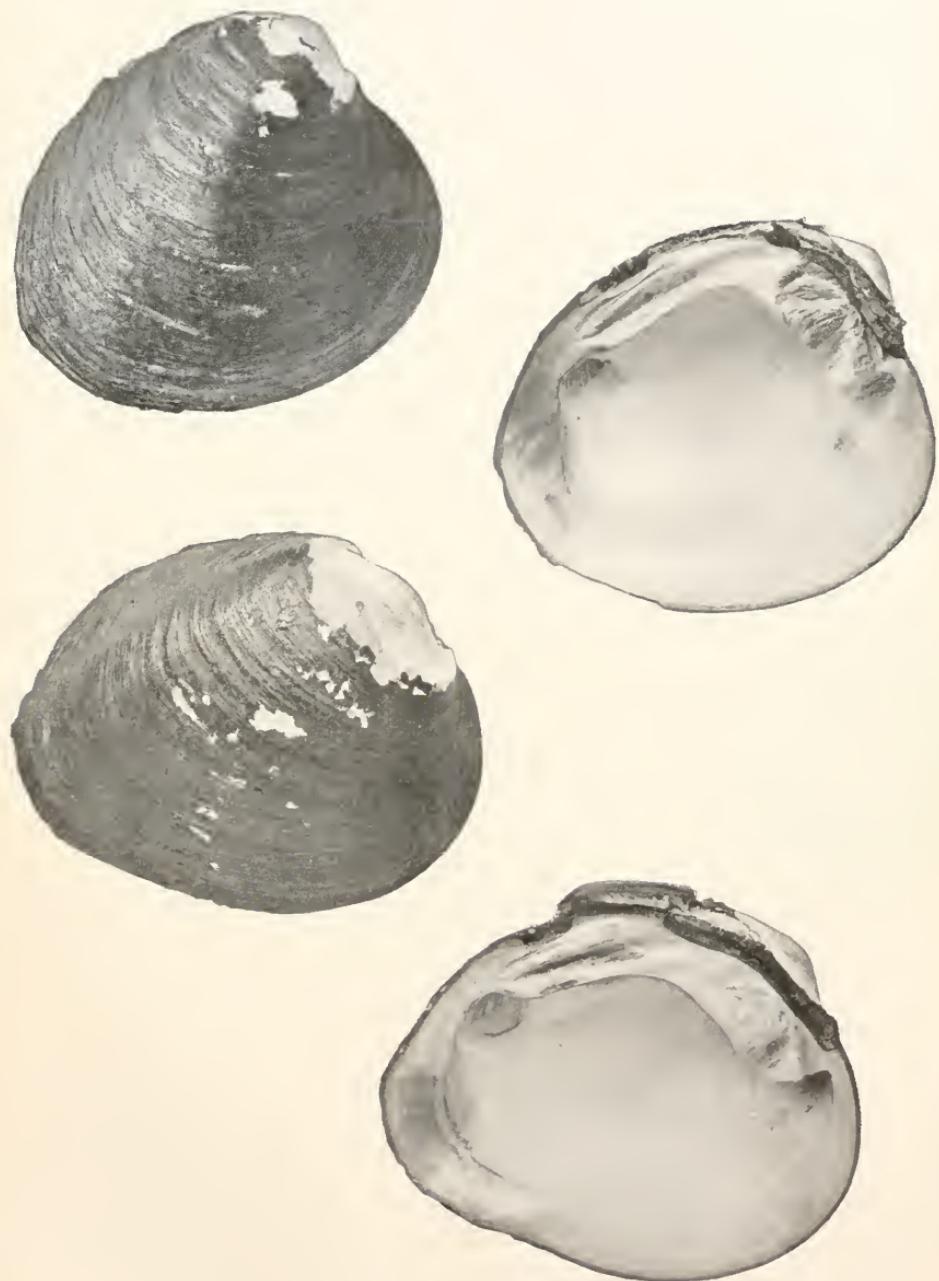
Journal of Science, Vol. I. Description of Lepidopterous Larvæ.

The following articles were published in the NAUTILUS, Vols. VIII and IX: A few notes on *Helix appressa*. A few notes on *Helix tridentata*. New records of Reversed American Helices. Remarks on the Variation in Form of the Family Strepomatidæ, with descriptions of New Species; read before the Cincinnati Natural Historical Society, December 7, 1875.

Quarterly Journal of Conchology, No. 11, May, 1877. "Review of the Genus *Tulotoma*, with remarks on the geographical distribution of the North American Viviparidæ."

The above list of papers published by Professor Wetherby, though not complete, gives some idea of the versatility of his mind and his great capacity for work. His last years were spent in a careful study of the mosses and grasses of the Roan Mt. region, which work, had he lived to complete it, would have been a valuable contribution to the botany of North Carolina. He made a fine collection of the smaller mammals peculiar to the Roan Mt. region, which he presented to the Smithsonian Institution. His large and valuable collection of minerals he presented to the Cincinnati University. His collections of plants, of fossils, of land and fresh-water shells, are very valuable, as they contain many unique specimens and all the types of the species described by him.

GEO. W. HARPER.



MARSH: NEW UNIONIDÆ.



DANIELS: *LAMPSILIS BLATCHLEYI*.

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No. 2.

A NEW SPECIES OF LAMPSILIS.

BY L. E. DANIELS.

Lampsilis blatchleyi n. sp. Plate II.

Shell long, elliptical or obovate, compressed, thin, inequilateral, slightly gaping behind; beaks low, but little inflated, pointed, with minute nodulous sculpture; dorsal and basal outlines lightly curved; anterior end somewhat narrowed, rounded; posterior end rounded and lightly and obliquely subtruncate above; surface with singular growth lines; epidermis somewhat concentrically wrinkled, projecting beyond the border of the shell, yellow green with faint green rays; pseudocardinals rudimentary, smooth, subcompressed; laterals straight, single in the right valve, partly double in the left; nacre brilliant, iridescent, having a somewhat coppery luster in the cavities, becoming very thin and greenish at the edges.

Length 45, height 21, diameter 10 mm.

Length 40, height 17, diameter 8½ mm.

Soft parts: Marsupium very large, occupying the posterior two-thirds of the outer gills, each lobe containing apparently about forty narrow ovisacs, the whole rounded and projecting well below the inner gills; inner gills united to the abdominal sac throughout their length; palpi large, elliptical, projecting backward but little; mantle much thickened on the border, its edges being decidedly double wavy and dark-colored; branchial opening rather large, with stout papillæ; anal opening small, crenulate; super-anal opening long, closed below; foot rather large.

Habitat: Wabash River, Section 32, Linn Township, Posey

County, Indiana. Found only on gravel bars in swiftly running water.

Fourteen specimens were collected by the author in August, 1901, while working for the Indiana State Geological Survey.

The smaller of the two type specimens (figured a little enlarged on pl. II) is in the Indiana State Museum, the other in the author's cabinet. Soft parts in the U. S. National Museum.

I am under obligations to Mr. C. T. Simpson for assistance in preparing the description of the soft parts.

The species is closely allied to *L. leptodon* Raf., particularly in its anatomical characteristics; the shell differs from that species by not having the wing and by the posterior end being rounded and in the full-grown shell being not more than one-half the size.

The two small shells found at Hardy, Ark., by Mr. J. H. Ferriss, by him referred to *L. simpsoni* (NAUTILUS, Aug., 1900, page 39), are without doubt this species.

Mr. C. T. Simpson informs me that Mr. Paul Bartsch of the National Museum believes he has found the same species in the Iowa River at Iowa City, Iowa.

I take pleasure in naming this species in honor of Prof. W. S. Blatchley, State Geologist of Indiana.

NEW ENGLAND MARINE COLLECTING.

BY REV. HENRY W. WINKLEY.

Occasional letters ask the following questions: "Can I stock up duplicates by a week or two in New England? Where is the best place to collect?" An answer to all may be made by narrating my own experience. During fifteen years I have devoted much time to collecting. Considerable dredging has been done, but not below 25 fathoms. The most careful searching has been done at Eastport, Wiscasset, Casco Bay and Old Orchard, Maine, and Wood's Holl, Mass. Other places have had some visits. This area contains perhaps 250 shell-bearing mollusca; of these I have 200 and lack 50. Of the 200 found by me, 113 species I have only for my own cabinet, 12 more I have spared for exchange perhaps once, and 20 more have yielded a few exchanges. This leaves 55 species that I have had in quantity.

Let me add notes on the fifty-five: *Litorina*, *Nassa*, *Ilyanassa*, *Mytilus*, *Mya*, *Tottenia*, and a few others are general in distribution. Many others are limited, as follows: *Ostrea*, *Venus*, *Urosalpinx*, *Bittium*, *Scytopus*, etc., common south of Cape Cod, but rare or wanting to the north. Again, *Buccinum*, *Lunatia*, *Cyprina*, and others should be sought in Maine. Many shells are found abundantly in limited portions of the coast. *Acmaea testudinalis*, common at Eastport, is scarce even in other parts of Maine. *Chiton albus* and *marmoratus*, with *Margarita groenlandica*, must be gathered at extreme tides in the Bay of Fundy. To be sure they occur elsewhere, but they are small and not abundant. The harvest season for *Lunatia* and *Cyprina* is after certain storms at Old Orchard. Sometimes these occur once or twice in a winter, or a year or more may pass without the harvest, but when they roll in they are very abundant. Dredging has an element of luck. One haul in the Penobscot Bay gave *Nucula proxima* enough for some years of exchanging. *Pecten magellanicus* is abundant in small areas, but it is easy to miss the spot. Another fact is the best region. *Buccinum* is common at Eastport, but small. The finest specimens are from Casco Bay. Yet other things, like Limpets and Chitons are at their best in Fundy waters.

The New England shells are very much in demand, but the lack of stock compels one to send frequent regrets. There is an amusing side to the work. One well-disposed friend asked for a dozen *Pecten islandicus*; I never saw a dozen. Prof. Verrill tells me that the government dredging only yielded three or four in a summer.

It must be understood by the readers of this article that I speak of my own experience. Some forms that have not been found abundantly by me may be found in quantities at times, yet I think one may form an estimate of the difficulties we meet in New England.

NOTES ON THE GIANT LIMAS.

BY WILLIAM HEALEY DALL.

The reception of a specimen of *Lima goliath* Sowerby (1883) the other day led to comparisons of and annotations on the great deep-water species. The dean of this assembly is the well-known *Lima*

excavata Fabricius (1779) from Norway (150–300 fms.). Next comes *L. goliath* from Japan (775 fms.), which reaches about the same size as *excavata*. A third form is recorded from the West coast of Patagonia (245–481 fms.), which I shall call *L. patagonica*, and a fourth *L. agassizii* n. sp., from the Gulf of Panama in 322 fathoms. A section, *Acesta*, has been proposed to include these species by H. and A. Adams.

All of them have fine microscopic radial striae and coarser radial sculpture, which is more pronounced toward the ends of the shell. In all there is a concentric grooving in the channels between the ribs, which, when the channels are narrow, takes on the appearance of punctation. All have a very narrow gape for the byssus and a flattened or impressed lunular area. All have a very general similarity externally. The Patagonian species has an astonishing likeness to *L. excavata*. It may be useful to record the distinctive characters.

L. excavata. Convex; the whole disk radially grooved, the grooving feeblower mesially; the most impressed part of the lunule close to the hinge line, the shell moderately areuate, the posterior outline roundly convex; color grayish white; resilium broad, somewhat oblique. Alt. 140; lat. 106; diam. 55 mm.

L. goliath. Flatter, broader, the middle of the disk smooth, posterior radials fine and close-set; most impressed part of the lunule lower down, the lunule itself longer, the shell more areuate; color milk white, sometimes with a yellow flush inside, hinge line longer and resilium slightly more central. Alt. 140; lat. 106; diam. 36 mm.

L. patagonica. Narrower and less convex, the whole shell straighter vertically, the lunule narrower and less impressed, a slight tendency to divarication in the obsolete radials of the middle of the disk, otherwise like *L. excavata*. Alt. 100; lat. 72; diam. 31 mm.

L. agassizii. Moderately convex; the radial grooving quite uniformly distributed distally, feeblower mesially near the beaks, the inter-spaces smoothly convex, and not sharp and corrugated anteriorly; lunule short, deep and narrow, anterior end of the hinge-line very short; area of the hinge narrow, and the resilium and pit very narrow and oblique; color chalky white, with a yellow periostracum. Alt. 97; lat. 78; diam. 30 mm.

L. goliath and *L. patagonica* show distinctly obsolete lateral teeth

near the angles of the hinge-line, but in *L. excavata* there is no trace of them, and the hinge of *L. agassizii* is too chalky to be certain about their presence or absence. They are most distinct and prominent in the young shell. *L. agassizii* was dredged by the U. S. Fish Commission steamer *Albatross*, as were our specimens of *L. patagonica*.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY H. F. CARPENTER.

The following species are additional to those hitherto described in this series, and complete the list of known species from Rhode Island:

214. *Lucina filosa* Stimpson.

Lucina radula Gould, Inv. Mass., 1st ed., p. 69, 1840; Mighels, Bost. Jour. Nat. Hist., iv, 318.

Lucina contracta De Kay, Nat. Hist. N. Y., 1843.

Lucina filosa Stimp., Shells of New Eng., 17, 1851.

Shell white, thick, orbicular, moderately convex; hinge margin straight; beaks small, pointed, projected over a small, indented, smooth, lanceolate lunule. Exterior covered with remote, concentric lamellar ridges, between which are round, thread-like striae. Interior chalky-white, polished around the margins. Hinge straight, with one cardinal tooth in the left valve and two small, diverging teeth in the right valve. Length and height 2 inches: breadth, 1 inch.

This is a rare, deep water shell and was not published in the description of the "Shell-Bearing Mollusca" of R. I. because it had never been found and was not likely to be found in our waters; but several specimens were dredged in Narragansett Bay, about two years ago, by Prof. Herman C. Bumpus, then of Brown University, in Providence, to whom I am indebted for the specimens now in my collection.

215. *Physa gyrina* Say.

Shell heterostrophe, oblong; whorls 5 to 6, terminating in an acute apex; suture slightly impressed; aperture a little more than half the length of the shell; labium a little thickened on the inner

margin. This species was found in Stafford's Pond, Tiverton, R. I., by Mr. John Ford and the writer while on a trip to the south-eastern part of R. I. in search of some of the rare land shells described by Mr. John H. Thompson, of New Bedford, Mass. I am sorry to state that our search for these rare shells was not rewarded by a single specimen.

216. *Sphaerium deformis* H. F. Carpenter.

Shell transversely oblong, elongated, both sides of nearly the same length; anterior margin curved; posterior margin abrupt, forming an angle with the hinge margin; basal margin having a twist to one side, as though some one had given it a pinch in the middle, squeezing it together and at the same time twisting it downwards; beaks large, inclined towards the anterior; valves thin, smooth, of a dirty brown color.

This species was found in Tiogue Reservoir, in the town of Coventry, R. I., by Mr. Richard Allen, who presented them to the writer. This species, with the somewhat doubtful *Cyprina islandica*, which (it is claimed) has been found in Rhode Island, brings up the number of species to 217, as per catalogue published by me in 1889, copies of which may be had free by addressing H. F. Carpenter, 58 Page St., Providence, R. I.

A NEW GENUS OF EOCENE EULIMIDAE.

BY THOS. L. CASEY.

As far as available literature discloses, the following genus seems to represent a new and very interesting type of Eulimidae, which may be outlined by the following characters:

Ptereulima n. gen.

Conical, devoid of sculpture, finely attenuate, with simple direct nucleus, umbilicated, the columella as usual without folds; anterior whorls having a large flattened process or wing at each side.

This genus appears to be more closely allied to the Chinese *Hoplopteron* of Fischer than any other known at present, but the latter is imperforate and has the apex obtuse.

Ptereulima elegans n. sp.—Almost evenly conical, the surface

shining, the more recent whorls perhaps a little more rapidly increasing in size than the first three or four, the apex acute with the embryonic whorls two in number and very minute, the next three small and simple, the five succeeding similar to the preceding three except in possessing, at each side, a large obtuse aliform process as shown in the figure. Umbilicus rimate. Inner lip defined throughout by callus, which is slightly reflected along the umbilicus. Surface of all the whorls feebly and evenly convex, the suture fine and simple but distinct. Length 3.5 mm.

Lower Claiborne Eocene (St. Maurice, La.)

The outer lip is broken away in the unique type, but undoubtedly possessed an aliform projection similar to that immediately above it. The processes are of the nature of thin varices which served to protect the animal, and the growth of the shell between these temporary arrests was probably very rapid.



THREE NEW SPECIES OF CHROMODORIS.

BY T. D. A. COCKERELL.

The species here described are obviously different from *C. californiensis*, Bergh, and *C. agassizii*, Bergh, and I do not find any descriptions applicable to them.

CHROMODORIS UNIVERSITATIS, n. sp. Length about 67 mm., rather narrow, mantle less ample than in *C. mcfarlandi*, not expanded at the sides; rhinophores and branchiæ wholly retractile; rhinophores stout, with numerous transverse lamellæ; branchiæ of about 12 large simply pinnate plumes, several more or less branched, and so bipinnate at the ends; oral tentacles just concealed by mantle; hind end of mantle gibbous; foot projecting 20 mm. behind end of mantle; breadth of sole when crawling $8\frac{1}{2}$ mm.

Color rich dark ultramarine blue, the edge of the mantle and the edge of the foot bright cobalt blue; rhinophores very dark blue; mantle with two longitudinal series of oblong very bright orange spots, about seven in a series; five round orange spots on the anterior part of the mantle, in front of the rhinophores; under surface of posterior lobe of mantle with a series of eight round white spots, the

hindmost four large, the others smaller and rather faint; sides of foot with a series of over ten round or oval orange spots; branchiæ very dark blue, speckled with orange within; sole deep blue.

The splendid blue pigment of this animal is dissolved out after death, even in sea-water; but very fast in formalin, producing a blue liquid which is turned pink by hydrochloric acid, but is not affected by alkalies, except that strong alkalies rapidly bleach it. Curiously, the orange spots of the animal seen through the blue solution, appear red, though in reality their color is not altered.

Hab.—In rocky pools between tides, San Pedro, Calif., July 28th, and La Jolla, Cal., early in August, all collected by Wilmatte P. Cockerell. The name of the species was suggested by the fact that it carries the colors (blue and gold) of the University of California. It was also collected at San Pedro by the naturalists of the University of California Marine Laboratory.

CHROMODORIS PORTERÆ, n. sp. Length about 11 mm., form of *C. universitatis*, but uniformly much smaller, and quite different in markings. Deep ultramarine blue, including the whole of the foot; mantle with two rather broad longitudinal stripes of bright orange, not united posteriorly, and ending anteriorly at the rhinophores, but anterior to the rhinophores is a transverse orange stripe; median stripe of *C. mcfarlandi* represented by an inconspicuous lighter blue line; margins of mantle very narrowly pure white; foot wholly without marks, except that the hind end has a suffused whitish stripe. Rhinophores and branchiæ entirely retractile. Branchial plumes eleven, in a circle, simply pinnate, entirely of the blue color of the mantle. After death, a number of conical white papillæ (about 9 on each side) appear beneath the hind part of mantle. After death, the blue dissolves out, and the body becomes a sort of pale greenish-blue, with the dorsal stripe very white; and the orange bands as in life.

Hab.—In rocky pools at low tide, La Jolla, Cal., early in August, rather common. (Wilmatte Porter Cockerell.)

CHROMODORIS MCFARLANDI, n. sp. Length about 35 mm.; mantle ample, covering head, but pointed end of foot projecting far beyond mantle posteriorly; rhinophores short and stout, lamellate, with over twenty transverse lamellæ; branchiæ entirely retractile, arranged in the shape of a horseshoe, not entirely surrounding the anus, which is produced into a truncate cone; branchial plumes

twelve, simply pinnate, some of the posterior plumes bifid; oral tentacles short, wholly concealed under mantle; eyes apparently absent. Mantle brilliant purple with a yellow margin (continuous in front and behind), and three longitudinal yellow stripes; the yellow of the margin is really bright orange, bordered with white; the median yellow stripe begins a short distance before the rhinophores, and runs between them; rhinophores dark purple; foot white with a purple tint, or quite purple when contracted after death; the end of the foot is purple with a dorsal longitudinal orange stripe. The purple color does not dissolve out in formalin.

Hab.—In rocky pools at low tide, La Jolla, Cal., beginning of August; San Pedro, Cal., July 27th. All collected by Wilmatté P. Cockerell. Quite common at La Jolla. Named after Prof. F. M. McFarland of Stanford University, who has done some excellent work on the nudibranchs of Pacific Grove, Calif.

NEW LAND SHELLS OF THE JAPANESE EMPIRE.

BY HENRY A. PILSBRY.

Chloritis bracteatus n. sp.

Shell depressed-globose, almost imperforate, very thin and fragile, brown. Surface dull to the eye, under a strong lens seen to be very densely covered with very small crescentic scale-like cuticular processes, densely crowded, and arranged in nearly regular descending rows. Spire convex. Whorls $4\frac{1}{2}$, the inner slowly, the last rapidly widening; separated by a deep suture. Aperture rounded, lunate, the peristome simple and thin, at the columellar insertion abruptly dilated, almost closing the umbilicus. Alt. $13\frac{1}{2}$, diam. 18 mm.

Nishigo, Uzen. Types no. —. A. N. S. P., from no. 904 of Mr. Hirase's collection.

This most northern of all its genus is strongly distinct by its excessively minute, curved cuticular appendages, unlike the hairs of all other species of *Chloritis*.

Pupisoma japonicum n. sp.

Shell globose-turbinate, umbilicate, light brown, very delicate and fragile. Surface delicately striatulate. Spire conic, the apex obtuse. Whorls $3\frac{1}{2}$, strongly convex. Aperture very obliquely ovate,

the peristome thin, fragile, unexpanded, the columellar margin broadly dilated and reflexed. Alt. about 1.6, diam. about 1.5 mm.

Hirado, Hizen. Types no. 82974 A. N. S. P., from no. 890 of Mr. Hirase's collection.

This is, I have not much doubt, the species collected by Hilgendorf at Yedo and in Idsumo, recorded by Prof. von Martens as "eine der *H. orcula* Bens. höchst ähnliche Art;"¹ but it differs from that Bengalese species in the much larger umbilicus and smoother surface, as well as in the noticeably smaller size.

Some immature specimens from Kashima, Harima (Mr. Hirase's no. 901) are probably the same species. With the two localities given by Prof. von Martens, this gives *Pupisoma* a wide range in central and southwestern Nippon. Until mature shells can be examined, the identity of the Nippon shells with the types from western Kiushu cannot safely be assumed, although it is likely.

PUBLICATIONS RECEIVED.

Catalogue of the Binney and Bland collection of the Terrestrial Air-breathing Mollusks of the United States and Territories, in the American Museum of Natural History, with enumeration of types and figured specimens, and supplementary notes. By L. P. Gratacap (Extr. from Bull. Amer. Mus. N. H. xiv, article xxiii, pp. 335-403. Dec. 3, 1901).

The "Binney and Bland collection" was formed by Mr. Binney, consisting in part of specimens from the collection of Dr. Amos Binney. It was given by him to Thomas Bland, from whom the Museum acquired it in 1882. The collection derives its importance from containing many of the shells illustrated in *Terrestrial Mollusks* Vol. III (the plates of which were reprinted in T. M. vol. V), besides many of Mr. Binney's types. The present list, of which the scope is stated in the title, is therefore important for reference to those who have occasion to study critically the land shells of the U. S. Mr. Gratacap has added notes upon many of the species. In some cases these record varietal names found upon the original labels, but elsewhere unpublished.

Five interesting plates showing generic distribution, and the relative

¹ Sitzungsberichte der Gesellschaft naturforschender Freunde in Berlin, 1877, p. 101 (Sitzung vom 17, April).

numbers of species in different parts of the areas covered by the genera have been added by Mr. Gratacap. To some extent these charts indicate, incidentally, areas in which but little collecting has been done. This is especially the case with plate xlii, representing the distribution of typical *Polygyra*.

The following names seem to be new to us:

Glandina truncata var. *minor* Binney MS. (p. 338, Cat. no. 16). Based upon "Variety of *Glandina Texaniana* Pfr.?" *Terr. Moll.* iv, pp. 141, 205, pl. 77, f. 21. Seems to be a very slender specimen of *G. truncata minor* Pils., *NAUTILUS* xiii, p. 46; *Proc. A. N. S.*, *Pbil.*, 1899, p. 404.

Macrocyclis vancouverensis var. *semi-decussata* Binney on label (p. 340). Astoria, Oregon. This is doubtless identical with *Circinaria spartella hybrida* Ane., which we have from Astoria.

M. concava var. *minor* (p. 341). No locality or definition.

Zonites (Gastrodonta) ligerus var. *sagdinoides* Gratacap (p. 344). "A very high 'bee-hive' form from Indiana."

Zonites (Hyalina) placentula Shuttl. (p. 350), Catal. no. 294 was Binney's earlier identification of *placentula*, subsequently becoming the type of *Z. lawi*. The specimens from Monroe Co., Tenn., and St. Giles Co., Va., are true *placentula*, as afterward identified by Binney. Through the kindness of Mr. Gratacap, I have been able to examine this series.

Helix (Patula) alternata var. *costigera* Bld. MS. (p. 357).

Helix (Patula) perspectiva "var. *carinata* (p. 358) from Union Co., Tenn., is almost planate, and below the periphery the striae approach extinction." Under *H. (P.) bryanti*, Mr. Gratacap writes, "Certainly interchangeable with var. *carinata* of *perspectiva*."

Triodopsis mullani (Bland), Cat. no. 1275 (p. 383), can hardly be that species.

Macroceramus (p. 397). The specimens recorded under *M. pontificus* as from Texas are probably *M. texanus*. That from Central America is no doubt *kieneri*, as recorded by Mr. Gratacap (see *Man. Amer. Land Shells*, p. 416, fig. 457).—H. A. P.

SOME UNDESCRIBED VARIETIES OF CYPREA.—By Mrs. Agnes Kenyon (*Jour. of Conchology*, Vol. X, p. 6, April, 1902).—In this paper the following varieties are described as new:

Cypraea tigris var. *lineata*. From Fiji. Differs from the type in possessing a number of longitudinal hair-like lines.

Cypraea mappa var. *viridis*. New Caledonia. Both back and base colored green or with only the dorsal surface suffused with a greenish tint.

Cypraea bregeriana var. *barbara*. New Caledonia. "Shell differing from *C. bregeriana* in the fineness of the dentition and without the violet coloring interstices, interior lined with white, not violet-purple as in *C. bregeriana*."

Cypraea helvola var. *borneensis*. Borneo. Shell smaller, with narrower sides, not incrassated or angulated, dorsal surface reddish-pink sprinkled with white, sparsely overlaid with brown spotting, base and extremities white.

Cypraea helvola var. *timorensis*. Timor Island. Differing from *C. helvola* in having white, not lilac, extremities, which are calloused, twin callosities at the posterior extremity.

Cypraea poraria var. *vibex*. New Caledonia and New Hebrides. Considerably larger than normal examples, and distinguished by a white porcellaneous band or stripe, extending from one extremity to the other, thus dividing the dorsal surface into two equal parts.

Cypraea miliaris var. *diversa*. Shark's Bay, West Australia. "Specimens very light in color, almost white, but showing spotting perfectly: they are quite distinct from *C. eburnea*, the teeth are not so coarse, the enamel of the dorsal surface is not so shining, the interior is colored pink or pale violet, while the interior of *C. eburnea* is either white or orange; specimens are comparatively small."

Cypraea carneola var. *rubicola*. Hawaiian Islands. The color of the teeth is a "bright rose-pink, in contradistinction to the purple-hued dentition of *C. carneola* or the colorless base and dentition of *C. luebeckiana*."—C. W. J.

THE MARINE WOOD-BORERS OF AUSTRALASIA AND THEIR WORK. A paper read before the Australasian Association for the Advancement of Science. By Chas. Hedley. An exceedingly interesting paper, giving an account of their method of propagation and boring; their ravages, remedies, natural enemies and classification. The ship-worms of Australasia belong to two genera, *Uperotis* and *Nausitoria*. The genus *Teredo* is at present unknown in that region, although "*Teredo navalis*" is indiscriminately applied by engineers to all ship-worms. The paper is illustrated by four plates.—C. W. J.

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No. 3.

CRUISING AND COLLECTING OFF THE COAST OF LOWER CALIFORNIA.

BY FRED. BAKER, M. D., SAN DIEGO, CAL.

Cruising on our southern Pacific coast is less indulged in than along the Atlantic seaboard, because there is a marked dearth of the land-locked harbors into which our eastern yachtsmen can run almost every night, or in case of a threatened storm. Nevertheless, two years ago, tempted by our summer promise of continued good weather, a party of seven, including my wife and two children, started from San Diego harbor for a run down the coast of Lower California in the staunch little schooner "Lura."

A late start made it advisable to anchor over night at the mouth of the harbor, but this gave a chance to get under way at daylight for a beautiful run of seventy miles to "Todos Santos" bay, on the sloping shores of which lies "Ensenada," the capital of the northern department of the Mexican territory of "Baja California."

As we ran we left broad to the starboard the Coronados, a group of seven small islands belonging to Mexico, but lying only twenty miles off San Diego, and a common terminus of our short cruises. They, like most of the off-shore islands, are bold volcanic masses, the largest, though less than three miles long, rising 880 feet above the sea, in many places sheer for hundreds of feet. This is a type of all the coast line for several hundred miles south. Bluffs and headlands, with here and there a narrow or broad valley sweeping down to the sea, but above all and crowning all, the foot-hills and the great mountains of the Coast Range.

It was just turning dusk as we rounded Ensenada Point into Todos Santos Bay, which is little better than an open roadstead, except for the protection offered by the chain of Todos Santos islands a dozen miles to sea, and the shelter of the Point from northwest winds. Immediately on dropping anchor we were boarded by the Comandante of the port, Don Luis Fernandez, and the quarantine officer, our old friend, Dr. Peterson, who courteously waived all examination, allowing us to go ashore at will. The two nights spent here with a nearly full moon shining down on us, just enough ground swell to keep in mind that we were cruising, and the balmy breeze of semi-tropical summer blowing over us, make a memory picture as near perfection as this world gives.

The day was busy. First we had the usual difficulties with the Mexican officials. In the absence of specific instructions, they were unable to determine whether we should register our craft as a private yacht or a passenger vessel. In either case they notified us that we must bear the expense and delay of telegraphing to the City of Mexico for instructions and license. Fortunately our schooner had on a former occasion been used in fishing down the coast, and after much argument Señor Victorio decided to grant us a three months' fishing license, at the same time clearing us with a clean bill of health for the return trip to San Diego. Under this very satisfactory arrangement we could run down the coast as far as the jurisdiction of the northern department reaches—something like 300 miles—land where we chose, collect what we liked, and when we were ready, sail away home without touching again at "Ensenada."

While our sailing master was arranging all this, the rest of us passed the day in seeing the few sights of the town, observing Mexican life, and visiting a few old friends. Among these Mrs. Gastelum holds first place, not for her society alone, though she is a woman of wide experience and much knowledge, but because in a former phase of her existence she was married to a Mexican customs official, who, during his sojourn at various ports on the Pacific Coast, had collected many bushels of shells which she has stored away in many boxes and barrels. This was the second time I had overhauled the lot, and as before I was astonished at the low price placed on my pickings, after a long conference between herself and her husband—a later acquisition. As I paid the bill I reflected that while I should undoubtedly have enjoyed the society of the former husband with

his evident love of shells, the later acquisition was probably more in harmony with the size of my pocket-book.

Away at daybreak Sunday morning, looking our last on "Ensenada," one of the goodliest sights to look upon it has been my fortune to see in a fair amount of knocking about. A great sweep of unbroken sand beach from "Ensenada Point" to "Punta Banda," a distance of eighteen miles, the high range of Punta Banda breaking off abruptly into the sea to the south, the horseshoe being completed by the low mesa-crowned Todos Santos islands. The town of Ensenada nestles on the low beach under the high ridge which forms Ensenada Point to the northwest, the broad valley reaching back with few breaks for twenty miles—then the foothills, and back of all, as always, the great mountains! It is our dry season and everything is parched and brown, and the near-by ridges show great outcroppings of black volcanic rock, but the blending of color under our brilliant California sun, and the foreshortening of great distances giving the effect of haze and softness, make a scene of marvelous beauty.

A glorious sail—free with the prevalent northwest wind—out through the narrow gate between Punta Banda and the easterly island of the Todos Santos group, which was alive with seal and waterfowl, and down a bold coast for twelve miles to cast anchor under the lee of the "Santo Tomas" headland noted all along the coast for its frequent storms. Here we divided up, one to sleep, two to fish, two to hunt deer, and two to collect shells and algae. All were successful but the deer-hunters. Unfortunately I did not keep my Santo Tomas collections apart from others, so I can give no fair idea of my catch, but a single *Haliotis rufescens*, Swainson, represents the only species not appearing in the list which closes this article.

Away again at sunrise for our final southward stretch. All day we ran almost before the wind, the coast growing generally more bold and culminating in Cape "Colnet," a great promontory presenting an almost unbroken face to the northwest, a cliff many miles long and many hundred feet high. We round the Cape with a half gale, and bear away southeasterly to our final destination, the little island of San Martin, lying five miles off the coast and ten miles from San Quintin, the first land-locked harbor in 200 miles from San Diego. We cast anchor at 3 a. m., and all hands slept late.

Of San Martin a few words' description must suffice. Roughly it is a round conical island, three miles in diameter, with two peaks, the higher a typical extinct volcano rising 471 ft., with an almost perfectly regular crater about 250 ft. in diameter, and between 75 and 100 ft. deep. The island is a solid mass of very hard volcanic rock with frequent small caves—evidently blow-holes—covered imperfectly where reasonably level by a thin soil which supports a moderately abundant vegetation in which various species of cactus are very plentiful. Up the slopes are great slides of loose rock, and owing to the cacti and the roughness of the way, the climb of a little over a mile to the top proved a very serious undertaking.

On the north side of the island a moderately level space, covering between 500 and 1,000 acres, is occupied by rookeries, mostly of pelicans and cormorants. The birds were most of them just beginning to fly, and a rough estimate convinced us that there were certainly some millions of them. We spent the greater part of one day watching them. The young cormorants waddled to the bluffs, spread their wings evidently for their first trial, and sailed or flew awkwardly into the ocean. There they were perfectly at home and could not be distinguished from the old birds, swimming and diving with perfect ease. But the pelicans had a harder time. They could fly very well indeed, but like the Irishman "had a devil of a time loighting." Starting from some slight elevation they would sail away majestically, managing their great wings and bodies remarkably well. After a turn of one or two hundred yards they would light without slowing up perceptibly, come down with a thud that we could hear a hundred yards away; turn two or three somersaults, and straighten up with the same appearance of surprise and offended dignity which we have all seen drunken men assume when suffering from similar mishaps. We actually laughed till we cried, and it was hours past our dinner time before we could agree unanimously to start for the boat.

Running easterly at a tangent from the southerly edge of the island for nearly 1000 yards is the so-called breakwater, a nearly straight line of enormous beach-worn boulders arranged like some huge artificial jetty. The acute angle has filled in with sand over a space of about fifty acres. In the bight there is safe anchorage except in a northeast storm. At two places dips in the breakwater bring it below high tide level, one opposite the little harbor, and the

other opposite the sand bar, and here the constant tidal current has excavated a little circular bay, covering two or three acres. This bay and the breakwater, with another little bight not much over thirty feet across, furnished nearly the only good collecting ground on the island. Otherwhere I found only a few of those hardy shells capable of standing any amount of buffeting by the waves, Chitons and Limpets, an occasional *Chlorostoma*, and the *Monoceros lugubre* Sby., which is in evidence along the whole coast from Ensenada south.

Dredging at moderate depths gave little results, but some of my fishermen friends who spend much time about this island, which furnishes some of the great fishing of the coast, make a practice of bringing up to me rocks which they haul up on their lines from considerable depths, attached to kelp roots. I am, therefore, able to list a considerable number of deep-water species. It has seemed to me advisable to publish the following list of shells secured from this small island and its immediate vicinity as a contribution to our knowledge of geographical distribution. I have to thank Dr. Wm. H. Dall of the National Museum, and Mr. Henry Hemphill of San Diego, Cal., for determining a very large share of the species about which I was in doubt.

After commenting on the fact that many of the specimens which I sent to him were too young or too worn to be identified specifically, Dr. Dall writes, "There was a small *Rissoina* among the shells which we have had for some years from San Pedro, but had not named, and with your permission we propose to call it *R. Bakeri*, Dall and Bartsch. There are also some of the new *Pyramidellidæ* described in the paper on W. Am. *Pyramidellidæ* which Mr. Bartsch and I have in preparation."

Our return trip was made much more slowly than the outward one, as the prevalent wind made it a long tack to windward. The only break was a night run against a sharp storm to make the doubtful shelter of Santo Tomas, where we lay for twenty-four hours with two anchors out, estimating the chances of a shift of the wind driving us to sea again. Our cruise lasted seventeen days, and was unanimously voted a success.

A NEW NAIAD FROM NEW ZEALAND.

BY CHARLES T. SIMPSON.

Diplodon websteri Simpson.

Shell long, rhomboid, compressed or subcompressed, inequilateral; beaks subcompressed, pointed, their sculpture apparently a few irregular lachrymose nodules arranged in a somewhat radial pattern; surface with uneven growth lines and impressed rest marks, sculptured throughout with lachrymose nodules which are often V-shaped, those along the upper part of the low posterior ridge slightly knobbed; epidermis dark olive green, clouded with lighter green, rather dull; pseudo-cardinals small, subcompressed, granulose, two in each valve; laterals straight, two in the left valve, one in the right; muscle scars small, shallow and irregular; nacre bluish, lurid purple near and in the beak cavities, thicker in front.

Length 67, height 32, diam. 14 mm.

Length 62, height 32, diam. 17 mm. *New Zealand.*

Specimens of the above were sent by Rev. William H. Webster, of Wauku, New Zealand, to the U. S. National Museum. They proved to be a new species, apparently allied to the *Diplodon novæ-hollandiæ* Gray of Australia, but smaller, less inflated and less solid than that species. In *D. novæ-hollandiæ* the anterior third of the shell is almost destitute of nodules; in the present species the whole surface is covered with them. These resemble somewhat those found on the *Unio tuberculatus* of Barnes, but are less elevated. The exact locality was not given.

NEW AMERICAN LAND SHELLS.

BY HENRY A. PILSBRY.

Most of the following species were discovered by Mr. Jas. H. Ferriss during a recent flying visit to the Southwest. I am indebted to Mr. G. H. Clapp for various suggestions regarding them; both Mr. Clapp and Mr. Ferriss agreeing with me that they are new.

Polygyra alabamensis n. sp.

Shell depressed, about like *P. vannostrandii* in general contour,

yellowish brown, glossy, finely rib-striate above and below; umbilicate. Spire low dome-shaped. Whorls about 6, *very closely coiled*, the last having the periphery situated high; a trifle deflexed in front. Aperture oblique, lunate; peristome white, narrowly reflexed, thickened within, the outer lip bearing a small, squarish tubercle, bent inward; basal lip bearing a marginal tubercle, abrupt on its outer, sloping or buttressed on its inner side. Parietal lamella short, erect, a trifle curved. Alt. 6, diam. $11\frac{1}{2}$ mm.

Auburn, Alabama. Types no. 82556 A. N. S. P., collected by Carl F. Baker.

The aperture is exceedingly similar to that of *P. inflecta*, from which this species differs in the sculpture, closely coiled whorls and open umbilicus. *P. cragini* is more depressed, with fewer whorls. *P. vannostrandi* has differently proportioned teeth and less closely coiled whorls.

Polygyra texensis n. sp.

Shell narrowly umbilicate, but the umbilicus rapidly enlarging at the last whorl, where it becomes more than one-fourth the diameter of the shell; depressed, light brown, glossy, lightly and rather distantly striate, usually with several coarse, strong wrinkles behind the lip. Spire low, convex. Whorls $5\frac{1}{4}$, slightly convex, slowly widening, the last abruptly descending in front, deeply and narrowly constricted behind the lip, convex beneath. Aperture small, oblique; peristome reflexed, thickened, the outer and basal lips each bearing a compressed tooth, parietal wall with a strong, erect V-shaped tooth which connects the ends of the lip, the upper branch of the V slender and low.

Alt. 5, diam. 13.5 mm.

Alt. 5, diam. 12.3 mm.

Colorado City, Mitchell Co., Texas. Types no. 83258, A. N. S. P., collected by J. H. Ferriss, 1902.

This species is clearly related to *P. texicana* (Moricand), which occurs at the same locality, as well as throughout the greater part of Texas. It differs from *texicana* in the larger size, with about the same number of whorls, the more regular increase of the whorls in width, and the proportionally wider umbilicus. In the great number of *P. texicana* I have seen from many localities, none approach *P. texensis*.

Sonorella granulatissima n. sp.

Shell depressed, in general shape much like *S. hachitana* and *S. rowelli*; narrowly umbilicate, the umbilicus between one-eighth and one-ninth the diameter of the shell; pale corneous-brown, becoming somewhat whitish around the umbilicus, with a conspicuous red-brown band above the periphery, and an inconspicuous, ill-defined, faint and wide one below the suture on the last whorl. Surface lustrous to the naked eye, but not glossy, under a strong lens seen to be *very densely and evenly granulose*, the granulation extending to the apex, but becoming more effaced on the base, subobsolete around the umbilicus, where some specimens show faint spiral lines. Spire very low. Whorls hardly $4\frac{1}{2}$, rather slowly widening at first, the last whorl very much wider, gradually and rather deeply descending in front, far below the periphery of the shell. Aperture very oblique, very shortly elliptical, almost circular, the peristome thin, narrowly expanded, the columellar margin dilated, ends approaching.

Alt. 10, diam. 19 mm.; oblique alt. apert. 9.7, width 11 mm.

Alt. 9.8, diam. 18 mm.; oblique alt. apert. 8.5, width 9.8 mm.

Huachuca Mts., Arizona; collected by Mr. Jas. H. Ferriss.

The umbilicus is narrower than in *S. hachitana* and *S. rowelli*, and it differs from both in the dense granulation. It is a species of delicate beauty, evidently distinct from any form collected by Ashmun and others in the same region.

Sonorella rowelli Newc., originally described from Arizona, was taken by Mr. Ferriss at Sanford, and in the Patagonia Mts. Mr. Ashmun also brought the species from the latter locality, and Dr. Geo. H. Horn collected a specimen at Fort Grant, Arizona. It is much like *S. hachitana* in miniature.

Mr. Binney rejected *rowelli* from the U. S. list because he considered it identical with *Helix lohrii* of Gabb from near Moleje, Lower California; but the two species are clearly distinct, and there seems to be no sufficient reason to doubt the truth of the original statement that the type of *rowelli* was taken by Frick in Arizona.

Bulimulus dealbatus pasonis n. subsp.

Much more slender and smaller than any described form of *dealbatus*, *schiedeanus* or *mooreanus*, but larger and stouter than *B. durangoanus* v. Mart. Reddish-corneous, with opaque white streaks and mottling; smoothish. Whorls nearly 6, quite convex. Aper-

ture small, ovate, less than half the length of the shell, the ends of the lip approaching. Length 15, diam. 7.3, longest axis of aperture 6.5 mm.

El Paso, Texas. Types no. 83259, A. N. S. P., collected by Jas. H. Ferriss, 1902.

PUBLICATIONS RECEIVED.

THE MOLLUSCA OF THE CHICAGO AREA: Part II., The Gastropoda. By Frank Collins Baker, Chicago Academy of Sciences. Bull. No. III, pt. II.

This handsome volume of 288 pages and 9 plates, which completes Mr. Baker's work on the Mollusca of the Chicago Area, will be a most welcome addition to the library of every American conchologist.

It has been for years a source of regret to all students of the American mollusca that so little attention has been given by our leading conchologists to the study of our fresh-water species. For more than thirty years practically nothing, except here and there a description of some supposed new form, has been published on this subject. The invaluable monographs published by the Smithsonian Institute have not only been out of print and scarcely attainable for years, but are quite out of date from a scientific standpoint. There is at present no work which gives the results of the material which has been accumulated in the public and private collections of this county, since the publication of those monographs, or embodies the modern ideas of classification. The land mollusks have apparently absorbed the attention of our working conchologists and the fluviatile forms have been almost totally ignored. The recent synopsis of the Naiades by Mr. Simpson has filled a long felt want, and placed that group in an enviable condition. The studies of Dr. Sterki are rapidly bringing the species of *Sphaerium* and *Pisidium* out of their chaotic condition. Similar work upon the fresh-water univalves is one of the greatest needs of American Conchology to-day. Mr. Baker's book is an important advance in the right direction, and should be an incentive for others to undertake similar work in other states. It is the first publication in this county, which attempts to treat the fluviatile forms with the same detail and thoroughness, which has been given to the terrestrial species. Both the author and the

Academy are to be congratulated upon the success with which the undertaking has been carried out.

Beginning with the *Pulmonata*, the land species, 51 in number, are first described, a sufficiently full synonymy of each is given with figures of the shell, and in nearly all cases of the jaw and radula. Full details of local distribution and of the habits and characteristic peculiarities of the different forms are also given. Pilsbry's classification is of course followed, and the whole treatment of the subject is in accordance with the latest scientific methods.

The most striking innovation in this portion of the work is the adoption of Say's name of *ovalis* for the species commonly known as *Succinea obliqua*. This is, however, in accordance with the recognized rules of nomenclature, and it is surprising that it has not been done before. The Succineas need a thorough revision. The specific characters exhibited by the shells are slight, and most of the described species seem to be exceedingly variable. It is possible that dissection will show reliable characters in the soft parts that can be relied on for specific determination. This work has yet to be done and would be a very valuable contribution to science. The jaws and radulae if examined in sufficient quantities to determine the amount of variability in each species, might furnish a sufficiently reliable basis for classification. The difference shown between the author's figure of *S. ovalis* and Binney's figure of that of *S. totteniana* and that between his figure of the radula of *ovalis* and Binney's figure of the same, and the remarks on the same subject with reference to the published figures, the jaw of *S. retusa* is very suggestive, and shows the necessity for additional work in that line. It is unfortunate that the author did not make an original figure of the jaw of *S. avara*, as there is reason to believe that Morse's figure, adopted by Binney, is not correct.

The treatment of the fluviatile univalves is a welcome addition to the scanty literature on the subject. The only regret is that the fauna of the Area is comparatively small and that so many of our common species are not represented in it.

The keys supplied under the different genera serve to bring out the differential specific characters, and will be of great assistance to the student in identifying his specimens. The jaws and radulae of many of the species are figured for the first time and many anatomical details of value are given. This branch of the subject is practi-

cially the first effort in a new field and forms the most valuable portion of the entire work. The synonymy is practically that of Binney with the addition of more recently described forms. Until a thorough revision of the subject can be made, based on abundant material from all parts of the country, and the study of the original types, this is no doubt the wisest course to pursue. The advisability of printing the MSS. names of Calkins, all of which seem to be synonyms, may be perhaps questioned.

The treatment of the *Limnaeidae* will in the main commend itself to the student. The author declines to follow Crandall in separating *Physa elliptica* Lea from *P. gyrina oleacea* Tryon. Judging from the figures given, it seems possible that *elliptica* as differentiated by Crandall does not occur in the Chicago Area. Certainly as species go in *Physa*, there is room for a difference of opinion on this subject. The elaborate descriptions of the *Pleuroceridae* are worthy of notice, and are a refreshing improvement upon the descriptions that do not describe, of the older authors in treating of this most difficult family. The union of *Goniobasis depygis* to *G. livescens* seems a rather radical innovation and will likely provoke dissent. If it serves to incite discussion and careful study, it will have accomplished a useful purpose.

The author's figure of the radula of *Cincinnatia cincinnatensis* is the first that has been published of that species. It is remarkable in not showing the "tongue shaped process from the middle of the anterior surface, reaching beyond the base," which is given by Stimpson as a generic characteristic of *Amnicola*. If the figure is correct, *Cincinnatia* must be removed from under that genus and placed elsewhere. We do not understand the statement on p. 335 that figures 4 and 11 on Plate I. of Haldeman's Monograph are mis-named. In the copy before us, both the description and plate give the proper references. The author also seems in error in his remarks on page 336 in regard to Binney's figure 162 as copied from Troschel. Neither Binney nor Troschel refer the radula there figured to *Amnicola cincinnatensis* Anth. Both refer it, and probably correctly, to *A. sayana* Anth., which is a synonym of *Pomatiopsis cincinnatensis* Lea, an entirely different thing. The synonymy of the *Campelomas* is that established by Call and, barring the reference of Lea's *milesii* to *subsolidum*, is entirely acceptable. There is reason to believe that Lea's species should rather be referred to *decisum*. The large specimen figured as *decisum* on plate 36, fig. 5,

looks very much like *C. integrum*. Possibly that species should have been included in the Chicago fauna.

The paper concludes with a full bibliography of the literature of the Area, and a list of all the works referred to, which in itself will be of valuable assistance to the student who desires to familiarize himself with the literature, especially that published since Binney's Bibliography was issued.

BRYANT WALKER.

ENTEROXENOS OSTERGRENI, A NEW ENDO-PARASITIC GASTROPOD.—In the current number of the *Zoölogische Jahrbücher* (xv, pl. 4, p. 731) a new parasitic gastropod of unusual interest is described by Kristine Bonnevie. It lives in the body-cavity of the N. European holothurian *Stichopus tremulus*, usually near the anterior end of the intestine, to which it is attached. The adult animal is vermiform, 6–15 cm. long, 4–5 mm. in diameter, without visible external opening, suddenly contracted anteriorly, into a slender style which is run into, and attaches it to the intestine of the host. The largest individuals sometimes lie free in the body-cavity. The integument is smooth, white and opaque. Under the epithelium there are circular and longitudinal layers of muscle. The internal anatomy is very simple. There is a narrow, long, central cavity, running backward from the end of the peduncle of attachment, the large ovary opening into it distally, while the testis lies anterior. The eggs are fertilized in the central cavity of the animal, and undergo development there. No trace of an alimentary canal is present. The gastropodous nature of the parasite is shown by the development and embryo.

The relationships of *Enteroxenos* are apparently with *Entocolax* and *Entoconcha*, but it is a more advanced evolution-product. The author gives provisional and guarded adherence to Schniemenz's theory of the mode of derivation of *Entoconcha* from *Stylifer*-like ectoparasites, but wisely abstains from homologizing the parts of the endoparasitic forms with those of normal mollusks, preferring to leave open the questions of the homologies of the body-wall, style of attachment and central cavity.—H. A. P.

A REVISED CENSUS OF THE MARINE MOLLUSCA OF TASMANIA.
By Prof. Ralph Tate and W. L. May. (Proc. Linnean Soc., New South Wales, pp. 344–471. Issued Dec. 19, 1901.)

This valuable contribution consists of an introduction to and history of marine conchology in Tasmania; a systematic list of species; a catalogue of synonyms with the corresponding names adopted; critical remarks on some species, and descriptions of two new species and one new genus—(*Legrandina*). The work is illustrated by five plates, containing 107 figures and 14 figures in text. A summary of admitted species shows: 10 Cephalopoda, 504 Gastropoda, 4 Scaphopoda and 157 Pelecypoda, a total of 653 species. It is a truly up-to-date catalogue, very few of the more recent improvements in nomenclature being overlooked.—C. W. J.

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COLLECTING UNIONIDÆ IN TEXAS AND LOUISIANA.

BY L. S. FRIERSON, FRIERSON, LA.

In July, 1901, Dr. W. S. Strode, Mr. H. G. Askew, and the writer, took a trip through eastern Texas, collecting Unionidæ. Dr. Strode first took a "still hunt" on the Sabine river, at Loganport, where he duplicated the experience of the writer, the results of which have already been given the readers of *NAUTILUS* (xiii. 79). We met Mr. Askew at Sheperd, a small town northeast of Houston, and in close proximity to "Big creek," and Trinity river.

From Big creek we obtained a few *Lampsilis lienosus*. This shell had never before been obtained so far west, nor had it been listed as a Texas species by Mr. Singley. The Trinity river, though shallow at this time and place, was swift, with a sandy bottom, a combination not favorable to *unio* life, and we had therefore poor luck. We obtained some magnificent *Quadrula pauciplicata*; big, glossy, black and nearly devoid of plications. They were otherwise interesting on account of the females being gravid, an unusual condition in this group. It is a true *Quadrula* in this respect. Some very fine *Q. trapezoides* were also taken. They were remarkably compressed, and some of them were likewise gravid. They bore their young (or eggs) in all four gills. This we believe has never before been noted, and effectually places this species in the genus *Quadrula*, as defined by Mr. C. T. Simpson, who placed it here without having the advantage of seeing a gravid female. We captured a trio of *L. amphichænus*, which extends both the habitat and size of this remarkable species, one of them being $5\frac{1}{4}$ inches in length. (The writer has since obtained a dead shell from the upper Brazos river.) A fine

series of shells were found which are in my cabinet as yet unnamed. They seem to be a perfect connecting link between *Q. aurea*, *houstonensis*, and *pustulata*. We were fortunate enough to find a couple of *Q. chunii*, *Lea*. This is the river in which the types were obtained and the specimens were typical in every respect. This shell is a very rare species, and one sadly abused. Whenever a uniologist gets a shell belonging to the group headed by *Q. trigona*, and about whose name he is in doubt, he at once dubs it *Q. chunii*. I may be rather harsh on my brother uniologists, but these two shells are my only *chunii* to date.

The next day we were at Nacogdoches, Texas. Here we saw the celebrated "Stone Fort," an ancient structure over whose walls the flags of *seven* governments have floated. How many of my readers must plead guilty, as I did, of never having heard of the Republic of Fredonia?¹ The full history of this structure was given us by Mr.

¹In April, 1825, Hayden Edwards made a contract with the government of Mexico for the introduction of 800 families into Texas. They were to settle in the neighborhood of Nacogdoches, and be provided with lands under the general colonization law. The location proved unfortunate. Nacogdoches had been settled many years, partly by Mexicans and partly by a roving class of people who had a prejudice against the Anglo-Americans. When the colonists selected their lands and commenced improving, some older claimant would appear. The courts were appealed to, but would invariably decide in favor of the Mexican constituents. These conditions continued until finally (1826) the Mexican governor of the province decreed the annulment of the contract and the expulsion of Edwards and his brother from the territory. But Edwards had expended several thousand dollars in this enterprise, and his colonists too had expended considerable in building their homes. The Indians (principally Cherokees) also had settled near-by under the provisions of the colonization laws, and being greatly dissatisfied, allied themselves with the Edwards colonists, who, assuming the name of Fredonians, declared their independence of Mexico. They proceeded at once to organize a legislative committee composed of eight Americans and five Indians. Learning that Col. Bean was preparing to resist their movements, they took possession of the old stone fort. Norris, the deposed Mexican Alcalde, collected some friends and on Jan. 4, 1827, entered the town; they were attacked by the Americans and Indians and driven off with a loss of one killed and several wounded. The Fredonians were sadly disappointed in not receiving the co-operation of the Austin colonists, who joined the 200 soldiers sent from San Antonio to suppress the infant republic. Seeing the hopelessness of maintaining the Republic of Fredonia, Major Edwards and his forces retired across the Sabine into the United States and disbanded.

We are indebted to Mr. Askew for the above notes from Thrall's History of Texas.—EDITORS.

Askew, who is as loyal a son of Texas as ever drew breath. It is a shame to the town that this fort has been recently torn down and replaced by a sordid brick store. As soon as we had breakfasted, we went to the La Nana creek, where we obtained the new species, *Q. lunanensis* recently described. We also obtained a number of the most deeply corrugated *Q. laticostata* we have yet seen. A solitary *Obovaria castanea* was taken. Numbers of *Tritogonia tuberculata* were found, but much to our disappointment, not a single gravid female was noted. (This species has not as yet been observed in that condition.) In this creek we obtained some *L. nigerrimus* and *Strophitus edentulus*, neither of which was listed by Mr. Singley. While cleaning up our catch in the hotel yard, we were joined by an intelligent-looking party who gravely asked if the "fossils" we were cleaning belonged to the Devonian formation! I shall never forget the guileless look of the doctor, as he gravely replied that they *did*.

By high noon next day we were at Rockland on the Neches river; we had taken our dinner, and by 5 p. m. were loaded with all the unios we wanted. This place is the metropolis of *Q. askewii*, of which some examples require a "Philadelphia lawyer" to differentiate from *Q. beadleanus*. The unios of this river are precisely the same as in the Sabine river. We obtained some *bona-fide* *Q. nodifera*, a species of the validity of which we had had doubts, but these are now forever laid aside. From Rockland we then took flight towards Lake Charles (Louisiana). En route we were compelled to stop over at Beaumont, Texas; while there we were fortunate enough to witness the striking of oil by one of the wonderful "gushers" of that place. It was a grand sight, the memory of which will never leave us. Lake Charles we found to be a shallow expansion of the Calcasieu river, about two miles wide, with sandy bottom, and covered by floating masses of the "Water Hyacinth," acres and acres of them. Calcasieu river is an extraordinary stream; for fifty miles it is sixty feet deep and a quarter of a mile wide, with no current excepting after rains, and not a shoal or sand-bar. The salt water comes up 40 or 50 miles during storms, and kills most of the fresh-water shells.

Those left alive were the following: *Q. apiculata* (*typical*), *Q. mortoni*, *L. texensis*, *L. hydiana*, *L. anodontoides*, *Q. trapezoides*, variety *pentagonoides* (new var.), and finally *Glebula rotundata*. I have in my cabinet two specimens of fresh water mussels (*Unio*)

having growing on them a shell of the salt water mussel (*Mytilus*); both host and mess-mate were alive when taken.

The *G. rotundata* were unusually fine, the shades of color exhibited by them I have never seen excelled. These were otherwise interesting as a number of them were gravid, and we felt all the importance of being true discoverers, as no student had ever before noted them in this condition. As regards this part of their physiology they are a true *Lampsilis*. The possession however of several unique characteristics will probably keep them in a separate genus.

Mention was made above of a new variety of *Q. trapezoides*. This shell differs from the type in having its dorsum very much *arched* or *bent* midway. The posterior is *widely* biangulated. The anterior is singularly truncated like *W. coruscus*, *Gld.* The effect being that the outline forms nearly an *equilateral pentagon*, hence the name. Aside from its form, it differs in being much smaller, and frequently entirely devoid of plication on either its sides or posterior slope. A striking peculiarity is that the posterior end of the ligament is perpendicularly over the centre of the base, whereas in the ordinary *trapezoides* the end is situated about three-fourths of the distance from the anterior to the posterior.

LIST OF SHELLS COLLECTED ON SAN MARTIN ISLAND, LOWER
CALIFORNIA, MEXICO.

BY FRED. BAKER, M. D.

Loligo sp? Giant squid.	Monoceros lugubre Sby.
Cavolina tridentata Gmel.	Marginella regularis Cpr. 30
Cerostoma nuttalli Conr.	fathoms.
Ocinebra circumtexta Stearns.	Marginella jewettii Cpr. Drift.
Ocinebra gracillima Stearns.	Marginella pyriformis Cpr.
Ranella californica Hds. 30 fathoms.	Volvarina varia Sby. Drift.
Fusus luteopictus Dall. On breakwater at low tide.	Olivella biplicata Sby.
Macron kelletii A. Ad.	Astyris gouldi Cpr. 30 fathoms.
Macron lividus A. Ad.	Astyris aurantia Dall.
Nassa fossata Gld.	Astyris gausapata Gld.
Nassa perpinguis Hds.	Astyris carinata, var. <i>hindsii</i> Rve.
	Astyris tuberosa Cpr.
	A nachis penicillata Cpr.

Engina carbonaria Rve. 30 fathoms.

Amphissa versicolor Dall.

Surcula carpenteriana, var. tryoniana Gabb.

Clathurella affinis Dall.

Mitromorpha filosa Cpr.

Mangelia interlirata Stearns.

Mangelia variegata Cpr.

Conus californicus Hds.

Cypræa spadicea Gray.

Polinices uber Val.

Crepidula aculeata Gmel.

Crepidula aculeata, var. californica Nutt.

Crepidula dorsata, var. ligulata Gld.

Crepidula rugosa Nutt.

Capulus sp?

Hipponyx antiquatus Linn.

Hipponyx tumens Cpr. In drift.

Scala hindsii Cpr.

Scala tincta Cpr.

Turritella goniostoma Val.?

Mesalia tenuisculpta Cpr.

Vermetus fewkesii Yates.

Cæcum californicum Dall.

Cæcum crebricinctum Cpr.

Cæcum laeve C. B. Ad.

Cæcum oreutii Dall.

Eulima compacta Cpr.

Turbanilla similis C. B. Ad.

Turbanilla tenuicula Gld.

Turbanilla torquata Gld.

Dunkeria gracilenta Cpr.

Dunkeria laminata Cpr.

Odostomia nuciformis, var. avellama Cpr.

Odostomia americana Dall & Bartsch.

Odostomia (Ivara) turricula Dall & Bartsch.

Miralda californica Dall & Bartsch.

Ividia armata Cpr.

Mumiola amiantis Dall.

Chrysallida aequisculpta Cpr.

Chrysallida cineta Cpr.

Oscilla aequisculpta Cpr.

Littorina planaxis Nutt.

Littorina pulchra.

Littorina scutulata Gld.

Lacuna unifasciata Cpr.

Diala marmorea Cpr.

Bittium armillatum Cpr.

Bittium attenuatum Cpr.

Bittium esuriens Cpr.

Bittium quadrifilatum Cpr.

Cerithiopsis columna Cpr.

Cerithiopsis metaxæ D. C.

Cerithiopsis munita Cpr.?

Cerithiopsis tuberculata Mont.

Triforis adversa Mont.

Cerithidea californica Hds.

Rissoina aequisculpta Cpr.

Rissoina bakeri Dall & Bartsch.

Rissoina infrequens C. B. Ad.

Rissoina interfossa Cpr.

Barleeia acuta Cpr., banded var. 30 fathoms.

Barleeia haliotiphila Cpr.

Barleeia subtenuis Cpr.

Rissoa acutilarata Cpr.

Rissoa aequisculpta Cpr.

Alvania aequisculpta Cpr.

Alvania carpenteri Weink.

Alvania notabilis Cpr.

Alvania purpurea Dall.

Amphithalamus inclusus Cpr.

Truncatella californica Pfr.

Truncatella stimpsoni Stearns. ¹	Ischnochiton magdalenensis Rve.
Liotia acuticostata Cpr.	Rather common, but no large ones found.
Liotia fenestrata Cpr.	Ischnochiton mertensii Midd.
Ethalia supravallata Cpr.	Ischnochiton sarcosus Dall.
Phasianella compta Gld.	Callistochiton crassicostatus Pils.
Phasianella compta, var. pulloides. 30 fathoms.	Callistochiton infortunatus Pils.
Eulithidium substriatum Cpr.	Mopalia muscosa Gld.
Pomaulax undosus Wood.	Lepidopleurus (Oldroydia) per- crassus Dall. "Not in Pils- bry's Monograph."
Chlorostoma funebrale A. Ad.	Chaetopleura hartwegii, var. nuttalli Cpr.
Chlorostoma gallina Fbs.	Tornatina inulta Gld.
Gibbula succineta Cpr.	Tornatina harpa Dall.
Leptothyra bacula Cpr.	Tornatina recta d'Orb.
Leptothyra carpenteri Pils.	Gadinia reticulata Sby.
Leptothyra paucicostata Dall.	Helix stearnsiana Gabb.
Calliostoma splendens Cpr.	Saxicava arctica Linn.
Trochiseus norrissii Sby.	Semele decisa Cour.
Margarita aeuticostata Cpr. 30 fathoms,	Cumingia californica Conr.
Scissurella rimuloides Cpr.	Tellina bodegensis Hds.
Haliotis eracherodii Leach.	Macoma secta Cour.
Haliotis fulgens Phil.	Petricola carditoides Cour.
Fissurella volcans Rve.	Venus fordii Yates.? V. torenma Gld.
Clypide'la calliomarginata Cpr.	Psephis salmonea Cpr.
Megatebennus bimaculatus Dall.	Psephis tantilla Gld.
Aemæa persona Esch.	Tivela crassatelloides Cour.
Aemæa scabra Nutt.	Saxidomax nuttalli Cour.
Aemæa rosacea. 4 fathomis.	Tapes staminea Cour.
Aemæa spectrum Nutt.	Chama exogyra Cour.
Nacella incessa Hds.	Chama pellucida Sby.
Nacella paleacea Gld.	Chama spinosa Sby.
Williamia peltoides Cpr.	
Lottia gigantea Gray.	
Ischnochiton conspiens Cpr.	

¹ In "NAUTILUS," Nov., 1901, Dr. Pilsbry describes *T. stimpsoni guadalupensis*, found by Mr. R. E. Snodgrass in Nov., 1899, as the first specimens of this genus found on any of the islands off Lower California. The above two species were collected in August, 1899.

<i>Lucina californica</i> Cour.	<i>Modiola</i> (<i>Gregariella</i>) <i>opifex</i>
<i>Lucina nuttalli</i> Cour.	Say.
<i>Lucina tenuisculpta</i> Cpr.	<i>Septifer bifurcatus</i> Rve.
<i>Diplodonta orbella</i> Gld.	<i>Philobrya setosa</i> Cpr. 30
<i>Lasea rubra</i> Mont. 30 fathoms.	fathoms.
<i>Lasea rubra</i> Mont., var. <i>sub-viridis</i> Cpr. 30 fathoms.	<i>Lima orientalis</i> Ad. & Rve. Young, dead. 30 fathoms.
<i>Kellia laperousii</i> Desh.	<i>Peecten latiauritus</i> Conr. Young.
<i>Kellia suborbicularis</i> Mont. 30 fathoms.	30 fathoms.
<i>Milneria minima</i> Dall.	<i>Hinnites giganteus</i> Gray. 30 fathoms.
<i>Lazaria subquadrata</i> Cpr.	<i>Monia foliata</i> Brod. In <i>Hinnites</i> , 30 fathoms.
<i>Area gradata</i> Brod.	
<i>Mytilus californica</i> Cour.	

NEW SPECIES OF PACIFIC COAST SHELLS.

BY WILLIAM HEALEY DALL.

Trivia atomaria n. sp. Shell minute, of a livid pink, with a substratum of olivaceous cast, the whole giving a pinkish brown effect; form subglobular, with a feeble dorsal sulcus, across which the ribs usually pass without interruption; in all there are about 18 ribs, with about equal interspaces, which are slightly sigrinate or minutely irregularly rugose, though the ribs are smooth; these ribs form an equal number of fine denticulations on the inside of the outer lip and over the pillar-lip and internal lobe; the extremities are very slightly or not at all produced; the spire is completely obscured. Length 3.2, breadth 2.6, height 2.2 mm.

Half a dozen specimens of uniform size were dredged in 18 fathoms, Panama Bay, by the U. S. Str. Albatross. This is the smallest species I have seen; even the dwarfs of the allied *T. subrostrata* Gray of the West Indian fauna are larger.

Trivia panamensis n. sp. Shell small, strongly sculptured, subovate, inflated, with its posterior extremity slightly produced; sculptured with about 15 rather sharp-edged strong ribs, of which about 4 are intercalary and the others continuous over the shell; in the middle line of the back they dip slightly but are not interrupted or attenuated; aperture narrow, strongly and nearly equally toothed on

each lip; the spire wholly concealed; the interspaces are smooth and somewhat wider than the ribs. Length 4.2, breadth 3.0, height 2.5 mm.

Two specimens were obtained with the preceding. Both forms have been submitted to Mr. J. Cosmo Melvill, of Manchester, England, who now possesses the types of Gaskoin's species, and has given especial attention to the group. He regards both as new.

Erato oligostata n. sp. Shell small, very nearly the shape of *Trivia atomaria*, but not ribbed, of a pale olive green, with the extremity of the canal deep rose pink; spire entirely concealed by a microscopically pustulate layer of greenish white callus; aperture narrow, very slightly shorter than the spire and not angulate externally behind; pillar lip with two anterior pliciform and half a dozen small pustular more posterior deposits of callus, the outer lip minutely dentate, the teeth smaller in front; the canal very short. Length 3.2, breadth 2.25 mm.

Found with the preceding. This is perhaps the smallest known *Erato*, and while, perhaps, nearest to dwarf specimens of the West Indian *E. maugeriæ* Gray, it differs from them in its more rounded form and less trigonal outline, as well as by the pustulated surface.

The European genus *Mysia* (Leach) Lamarck, of which the type is *Lucinopsis undata* Forbes and Hanley, has two right and three left cardinal teeth. A very similar type is found in American waters, represented in the Antilles by *Artemis tenuis* Recluz, and on the Pacific coast by *Dosinia subquadrata* Hanley. These forms however differ from *Mysia* by having three cardinal teeth in each valve. For this American type I propose the name of *Cyclinella*, and add the following new species to the fauna of the Pacific coast.

Cyclinella singleyi Dall. Shell solid, nearly orbicular, yellowish white, with an extremely thin periostracum, moderately inflated; surface with very fine close concentric sulci, giving a silky texture to it; an obscure depression radiates from the beaks near the posterior margin; lunule lanceolate, defined by an impressed line; pallial sinus narrow, high, rather blunt, pointing at the umbo; internal margins plain, the middle cardinals strong, the posterior right cardinal bifid. Length 40, height 39, diameter 22 mm.

Gulf of California in the Yaqui delta; Singley. It is smaller, more convex and solid, with vastly larger muscular scars than *C. subquadrata* Hanley.

NEW LAND MOLLUSKS OF THE JAPANESE EMPIRE.

BY HENRY A. PILSBRY.

Eulota (Aegista) minima n. sp.

Shell openly umbilicate, depressed, convex above and below, broadly rounded at the periphery, light yellowish-brown. Surface densely covered with fine, short cuticular scales, readily rubbed off. Whorls about 5, convex, separated by an impressed suture, slowly increasing, the last wider, convex beneath, not noticeably descending in front. Aperture broadly crescentic, oblique; peristome slightly thickened, very narrowly expanded and subreflexed. Alt. 3, diam. 6.3 mm.

Ōshima, Ōsumi. Types no. 83,369 A. N. S. P. from no. 929 of Mr. Hirase's collection.

Much smaller than any other Japanese species of the group, but a true *Aegista* in form and sculpture.

Eulota (Plectotropis) hachijoensis n. sp.

Shell narrowly umbilicate, biconvex, acutely carinate, pale brown or whitish corneous. Surface glossy, finely and faintly striate, and under a lens seem to be *very closely and distinctly engraved with spiral striae beneath*, more obsoletely so above. Whorls $4\frac{1}{2}$, moderately convex, the last descending below the keel in front, slightly concave above and below the peripheral keel. Aperture oblique, irregularly oval; peristome slightly expanded above, reflexed below, scarcely thickened, the ends somewhat approaching. Alt. 5.4, diam. 10 mm.

Hachijo-jima, Izu. Types no. 83,368 A. N. S. P., from no. 943 of Mr. Hirase's collection.

The pale color of the somewhat translucent, acutely carinate shell, and its beautiful sculpture of spiral striae beneath are the more prominent features of this species. It has the shape, but not the surface, of *Plectotropis*, and does not seem closely related to any of the known species from the adjacent islands of Japan, but resembles closely the Riukiu species *E. inornata* Pils., differing chiefly in the smaller number of whorls.

Eulota (Aegista) aperta var. *mikuriyensis* nov.

Similar to var. *trachyderma* Pils. & Gude, but more elevated and covered with very much coarser, less crowded, ragged cuticular

scales, or where they are rubbed off the surface is roughened with comparatively coarse, short striae. Whorls $5\frac{3}{4}$; periphery subangular at the beginning of the last whorl. Peristome thin, narrowly expanded and subreflexed. Alt. 7.5, diam. 12.5 to 13 mm.

Mikuriya, Suruga. Types no. 83317 A. N. S. P., from no. 937 of Mr. Hirase's collection.

The peristome of this species is of the same character of that of *trachyderma*. Mr. Gude dissents from the course I took in subordinating *trachyderma* to *aperta*. He writes: "I decidedly consider *trachyderma* as more nearly related to *mimula* than to *aperta*. Only look at the peristome, which is so decidedly thickened in *aperta* (and you must remember that your types of *aperta* were immature shells). If you will examine them again I think you will agree with me, and if *trachyderma* must be degraded to varietal rank, by all means place it under *mimula*" (G. K. G. *in litt.* Jan. 7, 1902).

I am now much disposed to adopt this view; but pending a thorough study of the group, I allow the published status of the form to remain.

Eulota (Plectotropis) mackensii var. *formosa*, nov.

Shell similar to *E. mackensii* and *vulgiraga* except that the umbilicus is less widely open and the lower margin of the lip is less deeply curved. Alt. $10\frac{1}{2}$, diam. $23\frac{1}{2}$ mm., whorls $6\frac{1}{2}$.

Taihoku, Formosa. Types no. 83332 A. N. S. P., from no. 429 of Mr. Hirase's collection.

Schmacker & Böttger have already commented upon this Formosan form of *mackensii*, which they had from Tamsui (Nbl. D. Mal. Ges. 1890, 136).

Eulota (Cælorus) caviconus Pils.

NAUTILUS XV, p. 117 (February, 1902). The locality should be Goto, Hizen, in Kyūshū. Mr. Hirase has sent specimens from Ojikajima, Hizen (no. 928), which are a little larger than the type lot, diam. 7.6 mm.

Eulota submandarina var. *compacta* nov. Differs from the typical form by the larger umbilicus, more elevated spire of $6\frac{1}{2}$ very convex whorls; very solid, light chestnut colored, without a peripheral band. Lip expanded and strongly thickened within. Specimens measure: Alt. 19.5 to 20, diam. 21.5 mm., and alt. 19, diam. 22.5 mm.

Yakushima. Types no. 82498 coll. A. N. S. P., from no. 777 of Mr. Hirase's collection.

Hirasea major n. sp. Shell depressed, lens-shaped, brown, dull and densely, finely obliquely striate above, paler, somewhat glossy and more faintly striate beneath. Spire convex; whorls 5, but slightly convex, the suture superficial, filled by the peripheral keel; last whorl very acutely carinate, the keel narrowly projecting, base convex, deeply impressed in the middle. Aperture oblique, obscurely trapezoidal-lunate, the peristome thin in the specimens seen. Alt. 3.3, diam. 6.7 mm. Chichijima, Ogasawara (Mr. Y. Hirase, no. 865). Much larger than the related *H. hypolia*, less polished below, and with a more acute peripheral keel. The specimens may not be fully mature.

Hirasea diplomphalus var. *latispira* n. var.

Similar to the typical form except that the spire is wider and less sunken. Chichijima.

Hirasea profundispira n. sp.

A species similar to *H. diplomphalus*, but differing in the much narrower spire, not one-third the diameter of the shell, and quite deeply sunken. Alt. 2.3, diam. 3.3 mm. Chichijima.

TWO NEW BULIMINI FROM CENTRAL ASIA.

BY C. F. ANCEY.

1. *Buliminus larvatus*, Anc.

Shell rather solid, cylindrical, attenuated and conic towards the apex, with an oblique and compressed umbilical fissure, somewhat shining, whitish flesh-colored, with irregular and oblique rather straight stripes of a darker hue. Apex brownish or horn-colored. Spire produced, obtuse. Whorls $7\frac{1}{2}$ -8, slowly increasing, not much convex, suture simple, not deeply impressed; the first 4 or 5 whorls gradually becoming broader, the following of nearly the same diameter, the last one cylindrical, compressed near the chink and obscurely and obtusely angular at the base, not ascending in front. Aperture oval, angulated superiorly, a little oblique. Peristome thickened and labiated internally, but slightly expanded, more broadly so at the columella. Margins distant, the columellar one simple and arched. Parietal callosity more or less conspicuous, sometimes thickened on each side.

Length $14\frac{1}{2}$ - $15\frac{1}{2}$, diam. $5\frac{1}{2}$, length of apert. 5 mm.

Loc.: Valley of Urmara, Talas-Alatan, Turkestan. Alt. 8500 feet (O. Rosen).

A distinct form, recalling in shape *Bul. Kuschakewitzi*, Anc., of Namangan, Khanat of Khokand, but very distinct and with the peristome less developed.

Some of the *Bulimini* that I have described from the same countries bearing only the very vague locality, Turkestan, I now avail myself of the opportunity of mentioning the precise localities of:

Bul. Ujfalfvianus, Anc., Usgent.

Bul. Turanicus, Anc., Usgent.

Bul. trigonochilus, Anc., Samarkand.

Bul. Annenkowi, Anc., Margelan.

Bul. Kuschakewitzi, Anc., Namangan.

Bul. Bomalotianus, Anc. (emend.), Alai. A smaller, highly colored variety which I propose to call var. *colorata*.

Bul. intumescus is also found at Osch, Eastern Turkestan, with *Bul. albiplicatus*, von Mart. The former appears to be a widely spread species.

2. *Buliminus albocostatus*, n. sp.

Shell small, rather thick, slender, cylindrical, turreted, rimate, shining, brownish horn-color or brownish, sculptured with strong, numerous, rather regular, white folds. Apex obtuse, smooth, horn-colored. Spire long, regularly attenuated, subcylindrical below. Whorls 8-9, somewhat convex, slowly increasing, suture simple, moderately impressed; the last whorl not much broader than the preceding one, barely attenuated or narrowed towards the base, minutely ascending in front. Aperture nearly vertical, ovate, sometimes produced externally, angulated superiorly. Peristome white, thickened, superiorly straightened, flatly expanded, margins not distant, joined by a heavy callosity. Columella simple, internally simple, not folded, externally broad.

Length $8\frac{1}{2}$ -10, diam. 3, length of apert. $2\frac{1}{2}$ mill.

Loc.: Valley of Karagoin, Turkestan (O. Rosen).

A charming and sharply defined, graceful species which I received at first labeled as " *Bul. albiplicatus*, von Mart., variety," and subsequently as " *Bul. albiplicatus*, West." I am not aware it was ever published by Westerlund. From *B. albiplicatus* it differs in being smaller, more slender and the characters of aperture, as well as the relative proportions, are altogether dissimilar.

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NOTES ON TASMANIAN AND WEST INDIAN CONCHOLOGY.*

BY C. HEDLEY, F. L. S.

The study of Tasmanian conchology has been facilitated by an excellent catalogue published last year by the late Prof. Tate and Mr. W. L. May in the Proceedings of the Linnean Society of New South Wales. Therein certain species ascribed to Tasmania by the Rev. J. E. Tenison Woods were rejected from the fauna chiefly because no later observer had taken them. Though apparently of foreign origin, their exclusion could not be wholly justified until that origin was ascertained. At the invitation of Messrs. A. Morton and W. L. May I undertook their examination. From the result it appears that five West Indian species were supplied to Tenison Woods, which he erroneously described as Tasmanian, and as new to science. They are :

Pleurotoma weldiana, T. Woods, Proc. Roy. Soc. Tas., 1876 (1877), p. 137, identical with *Drillia fucata*, Reeve, Conch. Icon., pl. xx, f. 169.

Ethalia tasmanica, T. Woods, Proc. Roy. Soc. Tas., 1876 (1877), p. 146, is the common West Indian *Modulus modulus*, Linne.

Adeorbis picta, T. Woods, Proc. Roy. Soc. Tas., 1876 (1877), p. 146, is *Chlorostoma fasciatum* Born. Wood's type answers well to fig. 2a of pl. 63 of Fischer's Monograph in the "Coquilles Vivantes."

Astele turbinata, T. Woods. Proc. Roy. Soc. Tas., 1876 (1877), p. 145, is *Chlorostoma scalare*, Anton, another well-known West Indian shell.

Semele werburtoni, T. Woods, Proc. Roy. Soc. Tas., 1876 (1877), p. 158, is *Codakia orbicularis*, Linne, a common Antillean species.

* From the Proceedings Royal Society of Tasmania for 1902.

FOSSIL LAND SHELLS OF THE OLD FOREST BED OF THE OHIO RIVER.

BY A. C. BILLUPS, LAWRENCEBURG, IND.

During the spring of 1902, owing to the unusually heavy rains which caused much cutting to be done on the banks of the Ohio and Great Miami rivers, near Lawrenceburg, Indiana, I had a fine opportunity to examine this interesting formation, the Old Forest bed, from a conchological point of view.

I had many years previously found large numbers of broken and bleached shells of species which are foreign to this locality in drift piles of the Great Miami and Ohio rivers, which I had always put down as dead specimens which had floated from some point far above where they were found. I found that this conclusion was erroneous and that these shells were washed from the deposit which contained them, and floated to the various drift piles where they first attracted my attention.

The Old Forest bed is a stratum of several feet in depth, six to eight feet below the present surface of the bottom lands of the Ohio, and contains in many places the well-preserved remains of mammoth trees; these are covered with a thick layer of yellow clay of an exceedingly hard and solid texture, which renders very difficult the extraction of fossils so delicate in structure as the land shells. About the only satisfactory way to obtain good specimens is to wash out with water until the clay is softened and then, if good luck follows you, you may obtain a respectable specimen. The use of a knife or chisel is absolutely useless, as in nearly every case the fossil extracted by these means is cracked or broken.

The comparison between these fossil forms and the species now found in this section is extremely interesting and worthy of study. To give a general idea of the species and to illustrate the difference between the fossil and recent faunas, I give the following list with notes on each species, which will show clearly what time has done to modify the molluscan fauna to the changed conditions of the present time.

It is remarkable how well the red coloring matter of all species is preserved, particularly in the case of *P. alternata* Say.

Vallonia pulchella Mull. Traces only of this minute shell.

Polygyra tridentata Say. Not many found, and these much more elevated and more deeply striated than the local living specimens.

Polygyra tridentata Say. Variety, region of the mouth much compressed and very deeply striated.

Polygyra inflecta Say. A few broken specimens.

Polygyra profunda Say. Very large well-preserved shells, heavy, and bands very plainly marked.

Polygyra albolabris Say. Very scarce.

Polygyra exoleta Binn. Common and of usual form.

Polygyra multilineata Say. Perhaps about the most plentiful of all the species found. This shell has never been found alive within twenty miles of this deposit.

Polygyra palliata Say.

Polygyra appressa Say. Several broken specimens.

Polygyra elevata Say. Fairly common and well preserved.

Polygyra pennsylvanica Green. Quite common in the deposit, but rare in this vicinity alive, only ten or twelve specimens having been found in the last six years after careful search.

Polygyra thyroides Say. Good specimens and fairly common.

Polygyra mitchelliana Lea. Common in the deposit, but rare and very local alive, only one locality known near Lawrenceburg.

Polygyra steutrema Fer.

Polygyra mouodon Rack. Very rare.

Pupoides marginatus Say.

Bifidaria contracta Say.

Bifidaria armifera Say. Common.

Cochlicopa lubrica Mull. A few broken specimens.

Circinaria concava Say. Quite common.

Vitreola hammonis Strom. Several broken shells.

Gastrodonta ligera Say. Common and in good condition.

Pyramidula alternata Say. Very large forms with distinct and beautiful color markings.

Pyramidula solitaria Say. Plentiful, large, heavy shells.

Pyramidula perspectiva Say. Rare.

Pyramidula striatella Anth. Rare.

Helicodiscus lineatus Say. Rare and broken.

Succinea sp. Very large, quite common, and in fine condition, nothing nearly as large found here alive.

Pomatiopsis lapidaria. Common. I have never taken this shell alive in the vicinity of Lawrenceburg.

Subsequent search will no doubt increase the numbers of this list,

as only those shells are mentioned which are perfect enough to render identification complete.

Poly-multilineata Say, which occurs plentifully in the middle portions of the State, seems at Lawrenceburg to be conspicuous by its absence, but is represented in the fossil state in large numbers, and is an exceedingly well-developed form for this species. In fact all these fossils are much larger and better developed than the species which are found alive here at the present time, with the exception of *Pol. abbolabris* Say., which is in the deposits a very rare shell, but most abundant in the surrounding woods. This may be due to the fact that *abolabris* is a thin and fragile shell, and has not been able to withstand the pressure of the surrounding soil so well as *elevata* and its more solidly-built brethren. However, this theory would not seem to hold good, as *Succinea*, one of the most fragile land shells, occurs in numbers, of large size, and in a splendid state of preservation.

A NEW HELIX FROM CALIFORNIA.

BY J. ROWELL.

Epiphragmophora exarata var. *rubicunda* Rowell.

Shell umbilicate, conic, less depressed than *exarata*, rather thin, sculpture somewhat malleated, the malleation lying in ridges parallel with lines of growth, color dark chestnut-brown, with one black band, summits of ridges and malleation dark orange-red, interior ruby-red; whorls seven, rounded, suture impressed, the upper whorls much less wrinkled than in *exarata*.

Alt. 21, diam. 27-30 mm. (Occidental.)

Alt. 25, diam. 31½ mm. (Freestone.)

Habitat, Sonoma Co., on a high, dry ridge, in the town "Occidental," on our "Cal. North Western R. R." I have visited the place three times, hoping to get other mature shells besides my original pair, but have searched in vain. All around are *exarata* proper and a few *infumata*, in the redwoods. But on my last trip, I stopped over at the town "Freestone," six miles this side of Occidental; I chose the place because there the redwoods and the open country meet, and I thought that for this reason it would be the right place for my shell, and a dense fog helping me, I was delighted to find a number of fine specimens.

A NEW FLORIDIAN HELICINA.

BY H. A. PILSBRY.

Helicina tantilla n. sp.

Shell very small, much depressed, finely and weakly striate. Spire low, convex, with rather straight outlines. Whorls $3\frac{1}{2}$, rather slowly widening, the last much wider, rounded at the periphery, convex beneath, impressed around the central callus. Aperture quite oblique, semi-circular, the lip obtuse, not noticeably expanded. Umbilical callus but slightly convex, not filling the cavity to the level of the surrounding convexity of the base. Alt. 1.3, diam. 2.5 mm.

Palm Beach, Florida. Type no. 77349 A. N. S. P., coll. by H. A. Pilsbry.

This tiny *Helicina* is quite distinct from all the Antillean species I have been able to compare. A single bleached specimen was gathered in June, 1899, with other small land shells, in the woods about a quarter-of a mile from the Atlantic beach. I did not notice it at the time, or I would have made search for more; it was only detected when the material was being sorted at home. No further specimens have turned up in the three years since this one was taken, and it is now published in the hope that some reader of the NAUTILUS who may visit that most beautiful of the winter resorts of east Florida, may search for the species, and complete the description by finding living specimens. It has no resemblance to the young of *H. orbiculata*.

NEW LAND MOLLUSKS FROM THE JAPANESE EMPIRE.

BY H. A. PILSBRY.

Alycæus vinctus n. sp. Moderately umbilicate with conic spire and the general aspect of other described Japanese species of *Alycæus*. Whorls $3\frac{2}{3}$, the first $1\frac{1}{2}$ smooth, corneous-brown, following whorls dull, whitish, sculptured with lamellar rib-striæ and finer spiral threads, the riblets as usual much more crowded on the back of the last whorl. Constriction of neck rather strongly marked, and with the portion following it, smooth, free from riblets, or with weak striæ only. "Tube" long, reflexed, lying in the suture.

Aperture oblique, circular, the peristome blunt, continuous, strengthened by *a very strong external rib* which is beveled to the lip-edge. Operculum yellow, thin. Alt. 2.7; diam. 3.6 to 4 mm. Tanegashima, Osumi. (Mr. Hirase, no. 916.)

Readily distinguished by the excessively heavy collar behind the lip and the comparatively conspicuous spiral threads. (*Vinctus*, bound, in allusion to the heavy, hoop-like lip-rib.)

Macrochlamys semisericata n. sp. Shell perforate, moderately depressed, dark reddish-brown, thin and somewhat translucent; the surface polished below, dull with a silken sheen at the periphery and above. Sculpture of excessively fine, close, slightly waved, parallel, slightly oblique rib-striæ above, extending from the apex to below the periphery, the base smooth. Whorls $4\frac{1}{2}$, slowly increasing, convex, separated by an impressed suture, the last much wider, rounded at the periphery. Aperture oblique, lunate; peristome thin and simple, dilated at the columellar insertion. Alt. 3, diam. 5.2 mm.

Kurozu, Kii, Types no. 83374, A. N. S. P., from no. 935a of Mr. Hirase's collection. Slightly smaller specimens were found at Nachi, Kii, Mr. Hirase's no. 955.

Distinguished from *M. cerasina* v. *awaensis* and *M. tanegashimæ* by the silken lustre of the upper surface, produced by fine parallel striæ. It is much smaller than *awaensis*. (*Semisericatus*, clothed half in silk.)

Zonitoides subarboreus n. sp.

Shell extremely similar to *Z. arboreus* (Say), from which it differs in the wider, less deeply lunate aperture, and the slightly wider umbilicus. The shell is brownish yellow. Surface glossy, irregularly striate, smoother below, without spiral striæ. Whorls $4\frac{1}{2}$, convex, separated by an impressed suture. Alt. 2.7, diam. 6 mm., or slightly smaller.

Hachijo-jima, Izu. Types no. 83375, A. N. S. P., from no. 951 of Mr. Hirase's collection; collected by Mr. Nakada, 1902.

This species is more depressed than *Z. nitidus*, and the base is less convex. If found in the United States, the differences from *Z. arboreus* would hardly be noticed; but its location on an island over one hundred miles off middle Japan, together with the slight divergence noted above, seem to indicate a distinct species. (*Subarboreus*

might mean under trees, but here it refers to the resemblance to *Zonitoides arboreus*, one of the commonest snails of North America.)

Microcystina circumdata n. sp. Shell perforate, depressed, with low, conic spire, glossy, light yellowish-brown, somewhat translucent. Sculpture of slight growth-lines, and under a strong lens there are seen to be excessively minute, close, engraved spiral lines above, and shallow, weak, and much coarser spiral sulci beneath. Whorls $4\frac{1}{2}$, convex, slowly increasing, joined by an impressed suture, the last whorl rounded peripherally, impressed around the perforation. Aperture lunate, oblique; outer margin of the peristome thin and simple, the columellar margin thickened within, narrowly dilated at the insertion. Alt. 2, diam. 3.4 mm.

Hachijo-jima, Izu. Types no. 83376, A. N. S. P., from no. 949 of Mr. Hirase's collection.

This species is larger and less depressed than *M. yakuensis*, which resembles it more than any other species which I have compared. (*Circumdatus*, surrounded, i. e., by the sea.)

Kaliella hachijoensis n. sp. Shell imperforate, globose-conic, smooth except for faint growth-striæ, yellowish-brown. Spire conic with slightly convex lateral outlines, the apex obtuse. Whorls $5\frac{1}{2}$, convex, separated by an impressed suture, the last inconspicuously and bluntly angular at the periphery, convex beneath. Aperture lunate, but slightly oblique; peristome thin and simple, the columellar end reflexed, whitish. Alt. 2.7, diam. 3.4 mm.

Hachijo-jima, Izu. Types no. 83377, A. N. S. P., from no. 941 of Mr. Hirase's collection, collected by Mr. Nakada, 1902.

Kaliella pallida n. sp. Shell minutely perforate, depressed conic, glossy and smooth except for faint growth-lines, translucent, pale yellowish-corneous, becoming whitish towards the apex. Spire conoidal, the apex obtuse. Whorls $4\frac{1}{2}$, convex, the suture impressed. Last whorl rounded at the periphery, a little angular in front of the aperture, convex beneath. Aperture broadly lunate, the peristome thin and simple, triangularly dilated at the columellar insertion. Alt. 2.5, diam. 3 mm.

Hachijo-jima, Izu. Types no. 83378, A. N. S. P., from no. 952 of Mr. Hirase's collection.

These species are somewhat similar in contour to *K. nanodes* (Gude) and *K. reinhardti* (Pils.), but are apparently different from any of the described Japanese species. (*Pallidus*, pale.)

Sitala latissima n. sp. Shell minutely perforate, low trochiform, dull brown. Surface nearly lustreless, showing two or three spiral cuticular threads on the upper surface of the last and next earlier whorls. Spire conic. Whorls $4\frac{1}{3}$, convex, separated by a deep suture, the last whorl angular at the periphery, flattened, only weakly convex beneath. Aperture oblique, somewhat square, the periphery thin and simple, dilated at the columellar insertion. Alt. 1.5, diam. 2.3 mm.

Yayeyama, Riukiu group. Types no. 83379, A. N. S. P., from no. 953 of Mr. Hirase's collection.

Distinct by its very broadly conic shape. (*Latissimus*, widest).

Pyramidula pauper var. *hachijoensis* n. var.

Shell low-conic above, convex beneath, higher than *P. pauper*, angular at the periphery; regularly rib-striate, dark brown. Whorls $4\frac{1}{4}$; umbilicus about one-fourth the diameter of the shell, being much narrower than in *pauper* or *depressa*. Alt. 3.7, diam. 6.5 mm.

Hachijo-jima, Izu. Types no. 83324, A. N. S. P., from no. 950 of Mr. Hirase's collection.

Although there is now a tendency to regard island races, where intergradation with the stem-form can not occur, as of specific rank, yet it seems to me that the relationships of such forms as this are best indicated by the use of a trinomial. The elevation of the spire and the narrower umbilicus readily distinguish this sub-species.

Buliminus luchuanus var. *oshimanus* nov. Shell similar to *B. luchuanus*, but differing in being thinner, with more conic spire, far less copious dark variegation, 7 to $7\frac{1}{2}$ whorls, and a thinner lip.

Length 18.3, diam. 7 mm.

Length 16.3, diam. 6.3 mm.

Oshima, Osumi. Types no. 83381 A. N. S. P., from no. 930 of Mr. Hirase's collection.

Buliminus hiraseanus n. sp. Shell rimate, egg-shaped, being short, broad and compact, the spire short, conic with convex outlines, apex obtuse; yellow or brown; surface minutely decussate. Whorls about 6, hardly convex. Aperture oblique, ovate; peristome white, expanded and somewhat reflexed, thickened within, a small nodule on the parietal wall defining a narrow channel at the upper angle. Length 8.5-9, diam. 5 mm. Mukojima, an islet southwest of Hahajima, Ogasawara. (Mr. Y. Hirase, no. 919.)

Diplommatina kobelti var. *ampla* Pils.

Proc. Acad. Nat. Sci. Phila., 1902, p. 28. The locality is Gotō, Hizen, not Uzen as given in the original description.

Carychium hachijoensis n. sp. Shell ovate-conic, whitish, slightly translucent, nearly smooth, the growth-lines being very faint. Spire conic, the apex obtuse. Whorls $4\frac{1}{2}$, convex, separated by a deep suture. Aperture ovate, a little less than half the length of the shell; the peristome reflexed, much thickened throughout, white; Outer lip bearing a strong tubercle on its inner margin above the middle; columella conspicuously truncate, ending below in a strong tooth-like fold, and bearing a stout, projecting lamella above. Length 1.5, diam. 0.8 mm.

Hachijo-jima, Izu. Types no. 83,382 A. N. S. P., from no. 946 of Mr. Hirase's collection.

This species differs from *C. noduliferum* Reinh. in its shorter spire of fewer whorls, the absence of striation, and the smaller size.

Tornatellina biplicata n. sp.

Shell imperforate, pyramidal, thin, brown, nearly smooth; spire straightly conic, the apex obtuse. Whorls $5\frac{1}{2}$, convex, separated by a well impressed suture. Aperture oblique, rather narrow, sometimes showing a strong narrow, white rib within; peristome simple; columella spiral, forming a strong callous fold; parietal lamella thin but high. Length 3, diam. 1.7 mm.

Hachijo-jima, Izu. Types no. 83,380 A. N. S. P., from no. 948 of Mr. Hirase's collection.

This species is more lengthened than *T. ogasawarana*, or *T. varicifera*, but less so than *T. nakadai* (*biplicatus*, two-folded).

Cochlicopa lubrica var. *hachijoensis* nov. Shell short and wide, with very obtuse apex; whorls $5\frac{1}{2}$. Length 6, diam. 2.7, length of aperture 2.4 mm.

Hachijo-jima, Izu. Types no. 83,383 A. N. S. P., from no. 940 of Mr. Hirase's collection.

LIST OF LAND SHELLS COLLECTED IN THE SACRAMENTO MTS., NEW MEXICO.

BY E. G. VANATTA.

During April and May of the present year Messrs. J. A. G. Rehn and H. L. Viereck collected natural history specimens in the Sacramento Mts., Otero Co., New Mexico, for the Academy of Natural

Science of Philadelphia. Collecting was done at Cloudercroft, in James Cañon, elevation 9500 feet, in the Canadian zone, where the following species were taken :

<i>Ashmunella rhyssa hyporhyssa</i> Ckll.	<i>Vitrina pfeifferi</i> Newe.
<i>Vallonia cyclophorella</i> Aue.	<i>Euconulus fulvus</i> Müll.
<i>Thysanophora ingersolli</i> Bld.	<i>Zonitoides arboreus</i> Say.
<i>Pupa sonorana</i> Sterki.	<i>Zonitoides milium</i> Mse.
<i>Bifidaria pilsbryana</i> Sterki.	<i>Punctum pygmaeum</i> Drap.
<i>Vertigo concinna</i> Ckll.	<i>Succinea avara</i> Say.

Ashmunella rhyssa hyporhyssa Ckll. was found in great abundance under logs and branches at Cloudercroft, the type locality.

At Highrolls, Otero Co., New Mexico, elevation 7000 feet, in the Upper Sonoran zone, the following species were collected :

<i>Ashmunella rhyssa hyporhyssa</i> Ckll.	<i>Bifidaria armifera</i> Say.
<i>Vallonia cyclophorella</i> Aue.	<i>Zonitoides arboreus</i> Say.
<i>Holospira roemerii</i> Pfr. and <i>Vitrean indentata umbilicata</i> "Singl."	<i>Succinea avara</i> Say.
Ckll. were taken at 4600 feet elevation in the Middle Sonoran zone, in the Alamo Cañon near Alamogorda, Otero Co., New Mexico.	

GENERAL NOTES.

LIMNÆA AURICULARIA IN AMERICA.—In *Science*, July 11, 1902, p. 65, Dr. R. E. Call records the occurrence of a well-established colony of this species in Flatbush, Brooklyn, N. Y. They were probably introduced on plants.

PLANORBIS PARVUS WALKERI n. var.

This variety is similar to *P. parvus*, but distinguished by having the lip internally thickened.

Types in coll. of Academy of Natural Sciences, no. 81143 from Hartland, Vt., gift of Mr. Bryant Walker; cotypes in coll. Walker.

It also occurs at the following Michigan localities: Oakland Co.; Detroit; Cambridge, Sewell Co.; Antrim Co.; Fenton, Genesee Co.; Lake near Charlevoix; and Grand Rapids, all communicated by Mr. Bryant Walker.—E. G. VANATTA.

VERTIGO COLORADENSIS AND V. INGERSOLLI.—In our Revision of Pupæ, 1900, pp. 599, 603, Mr. Vanatta and I stated that we had not seen the descriptions by Mr. Cockerell published in the *British Naturalist*, 1891. The missing number of that journal has now been

received, and as there are probably but few copies accessible to American conchologists, we reprint below the passages relating to American *Pupidæ*.

"In the 'Journ. of Conch.'," 1889, p. 63, a small species of *Pupa* from Colorado was named *P. coloradensis*, but not described. It is a distinct species allied to *corpnlena*, but decidedly smaller (length $1\frac{1}{2}$ mill.), more striate and slightly narrower. There are four apertural lamellæ, [p. 101] one on the parietal wall, one on the columella, and two—the lower one the largest—on the outer wall.

"*Pupa ingersolli* Ancey MS., mentioned on p. 64 of the same volume, has also never been described. It is allied to *coloradensis*, but 2 mill. long, cylindrical, dull brown, with half a whorl more,¹ and a double lamella² on the parietal wall. *P. montanella*, indicated on the same page as *P. coloradensis*, proves to be a form of *P. pentodon*—T. D. A. C." (The British Naturalist, 1891, part v. pp. 100, 101.)

The description of *P. ingersolli* is so abbreviated that in a critical group like the *modesta* group of *Vertigo* it may be doubted whether it is sufficiently diagnostic. Prof. Cockerell, who has affirmed the identity of *ingersolli* with his *concinnula*, seems to have held a different view when describing the latter. As the original description of *ingersolli* is only about two lines long, and quite inexact for *concinnula*, it may fairly be held, I think, that it was not recognizably defined, and the name *concinnula* should not be displaced.—H. A. PILSBRY.

ASHMUNELLA LEVETTEI (Bld.). Specimens of this species (formerly referred to *Polygyra*) were taken alive in the Huachuca Mts., Arizona, by Mr. J. H. Ferriss, and have been dissected by Mr. E. G. Vanatta. It proves to be a typical *Ashmunnella* anatomically. Since this is the case, it is altogether likely that the related *Polygyra mearnsi* Dall will follow suit; so that *Ashmunnella* will include numbers 84 to 89 of the check-list of 1897. It should be mentioned that Mr. C. F. Ancey had already, on conchologic or distributional grounds, referred *levettei* to *Ashmunnella*, but Mr.

¹ It will be noticed in this connection that the number of whorls is not stated in the description of *P. coloradensis*. H. A. P.

² The term "a double lamella" may be applied to the parietal process of *Bifidaria procera*, *armifera*, *contracta*, etc., but it is conspicuously inexact when used for a species with two separate and distinct lamellæ upon the parietal wall, as in *Vertigo*. H. A. P.

Vanatta's investigation places the generic position of the species on an indisputable basis.—H. A. PILSBRY.

A LARGE PEARL.—A short time ago, one of the students of the Southern Collegiate Institute, of Albion, Ill., had occasion to use a live *Unio* in illustrating some point in zoölogy. When the shell was opened there was found in the mantle quite a large, regularly-formed pearl, 12 mm. wide, and 7 mm. high. The pearl was found in the anterior side of left valve. There is quite a depression in the valve where the pearl was found, although it was not connected with the shell. The *Unio* from which the pearl was taken is *U. multiplicatus* Lea, and is a mature shell. It was found in the Bonpas Creek, not far from where it empties in the Big Wabash River.—C. S. HODGSON.

MR. SLOMON ROUS, whose stock of Cape shells is well known to many of our conchologists, has removed to 929 DeKalb Ave., Brooklyn, N. Y. He reports the receipt of large consignments of South African shells, including most of the recently described species.

NEW PUBLICATIONS RECEIVED.

CHECK LIST OF NORTH AMERICAN NAIADES, by B. H. Wright and Bryant Walker. 8vo, pp. 19, Detroit, 1902. An alphabetically arranged list of species with the genera and groups indicated, and the distribution briefly stated. It will prove useful for checking collections, as well as for determining the modern genera of collections labeled by Lea's system. It is based upon Simpson's Synopsis.

NECROLOGY.

A veteran conchologist, WILLIAM LEGRAND, of Tasmania, has just died, aged 82. He was a book-seller in Hobart, and printed (with his own hands) a little book, Collections for a Monograph of Tasmanian Land Shells (1871), which Tryon noticed in Volume III. of the Manual of Conchology. Much of the Tasmanian material described by Hanley was, I believe, obtained by him, and Tenison-Woods described many shells from his collection. Tate and May named a genus *Legrandina* after him. *Turris legrandi* Ten.-Wood; *Columbella legrandi* T.-W.; *Calliostoma legrandi* T.-W.; *Gibbula legrandi* Petterd; *Zidora legrandi* Tate, perpetuate his memory. His collection was purchased by C. E. Beddome.—C. HEDLEY, Sydney, N. S. Wales, July 9, 1902.

We regret to record the death of DR. J. G. COOPER, at Haywards, California, on July 19, at the age of 72 years. Extended notice will follow.

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HELIX VAR. CIRCUMCARINATA AND PYRAMIDULA ELRODI.

BY ROBT. E. C. STEARNS.

I have to thank Mrs. M. Burton Williamson of this city for the opportunity to examine a specimen of *Pyramidula elrodi* described by Dr. Pilsbry on pages 40-41 of *THE NAUTILUS* for August, 1900. As the example was sent to Mrs. Williamson by Professor Elrod there is no doubt as to its authenticity. The form is unquestionably the same as that described by me in the *Annals of the N. Y. Acad. of Sciences*, Volume I, November, 1879, as *Helix var. circumcarinata*,¹ Mrs. Williamson's specimen differing only in size, being .85 as compared with .92 and 1.01 of an inch, greater diameter, of my examples.

Several specimens of *circumcarinata* were given to me by the late A. W. Crawford, of Oakland, some before and some after my description was written. He had numerous examples, received from an acquaintance or friend, who gave "Turloch, in Stanislaus county, Cal.," as the locality where he had found them. Subsequently Mr. Crawford discovered he had been deceived and stated the true locality as being "near Columbia, in Tuolumne county." His friend may have been guilty of a second fib. As I noticed certain characters suggestive of possible relationship to the well-known *Epiphragmophora mormonum*, which occurs in the Tuolumne region, I have regarded the later habitat given by Mr. Crawford as quite probable.

¹ See Binney's *Manual of Am. Land-Shells*, 1885, p. 141; also, Pilsbry's *Catalogue*, Phila., 1898, p. 4.

The general region in which Columbia is situated remains to be explored; it has been barely glanced at. Though the occurrence of *circumcarinata* thereabouts has not been verified by subsequent collectors, its non-occurrence there cannot safely be assumed upon the ground of extreme remoteness from the Montana region explored by Professor Elrod, when we have the more extraordinary fact in the matter of distribution, exhibited by the occurrence of *Pyramidula hemphilli* Newc. (heretofore credited to Arizona, Nevada, Idaho, Utah and Colorado), on Catalina Island, twenty-five miles distant from the mainland of southern California, where Mr. Hemphill, some months ago, collected numerous living examples, fifty or more, which he kindly showed me.

Here is a conundrum in geographical distribution, of great interest and certainly "a hard nut to crack."

Hemphill's original find of this peculiar form was in the White Pine mining district, extreme eastern Nevada.

A few years ago the distribution of *Vallonia pulchella*¹ was given as "Montana eastward, from Canada to, or nearly to the Gulf of Mexico. Europe." In September, 1900, it appeared suddenly upon my grounds in Los Angeles and continued to be abundant for some months; it is now scarce. Whence it came and whither it is going, who can tell?

Los Angeles, Cal., August 26, 1902.

"PYRAMIDULA" ELRODI AND EPIPHRAGMOPHORA
CIRCUMCARINATA.

BY H. A. PILSBRY.

Dr. Stearns, having expressed the opinion that the two *Helices* named above are specifically identical, I have again compared them, and find my previous idea of their distinctness confirmed. My material consists of the types and numerous other specimens of *P. elrodi* and two specimens of *E. circumcarinata*, an adult and a young one, received from Dr. Stearns years ago, about the time the species was described. The difference between Dr. Stearns' views and my own, of the affinities of the two *Helices*, may be due to his

¹ See THE NAUTILUS for October, 1900.

having, perhaps, no examples of *circumcarinata* at hand for direct comparison with *elrodi*.

The following differences appear on comparing the shells: With the same general figure and size, *P. elrodi* has a wider umbilicus, and viewed from above, the last whorl is wider; the base is more convex, being swollen and almost subangular around the umbilicus; the rib sculpture is coarser; the finer spiral sculpture is much developed in *P. elrodi*, especially beneath, while *E. circumcarinata* shows no spirals there, but only minute papillæ scattered between the ribs. The shape of the apertures differs: In *P. elrodi* the transverse axis does not much exceed the longitudinal, while in *circumcarinata* it is conspicuously greater. In Dr. Stearns' species, the basal lip is narrowly reflexed, while in *P. elrodi* it is at most merely expanded a little. Finally, the apices show important differences.

In *E. circumcarinata* the first $1\frac{1}{2}$ whorls appear smooth, a high power showing a minute, even, criss-cross pebbly sculpture, like that of *E. mormonum*, and the next whorl shows only very weak riblets, with papillæ between them; while in *P. elrodi* the strong riblets begin earlier, and there is no trace of the *mormonum* type of sculpture, even in young removed from the uterus of the mother.

These facts indicate, in my opinion, that the great general similarity between the two species in question is merely superficial, and probably the result of similar conditions acting upon organisms originally diverse, and indeed not closely related. *P. elrodi* belongs undoubtedly to the *P. strigosa* group; while, although its soft anatomy is unknown, *circumcarinata* will probably prove to belong where Dr. Stearns placed it, near *mormonum*, although with present knowledge it is in all probability distinct from that specifically. In other words, I think the two species belong to different genera.

It might be as well to say here that the *strigosa* group of snails is not correctly placed in *Pyramidula*. They do not belong in the *Endodontidæ* at all, but are *Helicidæ*, nearer *Sonorella* than any other group, but constituting a new genus which will be suitably defined in the near future.

In South Australia there is a group of snails called *Glyptorhagada*, some species of which resemble *P. elrodi* remarkably in form, sculpture and color. They belong, however, to a different sub-family of *Helicidæ*, and the resemblance, as in the case of *E. circumcarinata*, is a case of convergent evolution.

CONTRIBUTIONS TOWARDS THE KNOWLEDGE OF THE MOLLUSCA OF MADAGASCAR.

BY C. F. ANCEY.

Helicarion (?) Dautzenbergianum Anc.

Testa imperforata, convexo-depressa, angulata, tenuis, pellucida, nitens, corneo-virens, supra angulum medianum fascia rubrofusca sat angusta circumdata, indistincte et obsolete lineis radiantibus subplicosa. Spira depresso-conoidea, subobtusa, convexa. Anfractus $4\frac{1}{2}$ celeriter crescentes, subconvexi, sutura distincta sed haud profunda; ultimus magnus, dilatatus, utrinque convexus, medio angulatus, basi subtumidus. Apertura ampla, distincte obliqua, extus angulata, lunato-oblunga, leviter supra convexo-producta, basi regulariter usque ad columellam arcuata, marginibus remotis.

Diam. maj. 18, min. $15\frac{1}{2}$, alt. $9\frac{1}{2}$, alt. apert. (oblique) 9 mill.

Hab.: "Montagne d' Ambre," N. Madagascar.

A very remarkable species on account of the keel and its very peculiar shape and coloration. It may, perhaps, be referable to *Euplecta* or *Hemiplecta*.

Euplecta oxyacme Anc.

Testa fragillima, subimperforata, conico-trochiformis, parum nitens, opacula, corneo-lutescens, concolor, sub valida lente lineis confertissimis incrementi notata et striis argutis permultis spiralibus decussata, subtus paulo nitidior. Spira elevata, perfecte conica, rectilinearis, acuta. Anfractus 6 regulariter crescentes, priores convexiusculi, inferi applanati, sutura linearis, appressa; ultimus acute et compresse in medio carinatus, infra convexus, supra carinam planodeclivis, antice haud deflexus. Apertura lunata, extus angulata, subobliqua, marginibus distantibus, supero recto-declivi, basali regulariter arcuato, columellari leviter supra perforationem parvulam expansiusculo, eam fere prorsus occultante.

Diam. maj. $13\frac{1}{4}$, min. $11\frac{3}{4}$, alt. apert. oblique $5\frac{3}{4}$, alt. $9\frac{1}{2}$ mill.

Hab.: Antankaratra Country (Humblot).

Of the same shape and size as *Rotula argentea*, Reeve, but of thinner texture and different color. It may belong to the same genus, but is perhaps related to *Euplecta* (?) *feneriffensis*, Angas. The generic reference, therefore, is doubtful.

Hemiplecta oleata Anc.

Testa globoso-depressa, tenuis, anguste perforata, oleoso-nitens, supra tenuissime et irregulariter granulata; subitus magis nitida, lineis radiantibus incrementi notata et sub valida lente striolis spiralibus undulatis valde confertis cineta, superne fusca, ad peripheriam zonula pallida cingulata, infra peripheriam intense castanea, denique basi pallidior. Spira convexa, obtusa. Anfractus 5 convexiusculi, regulariter crescentes, sutura appressa nec profunda divisi, ultimus amplius, vix rotundato-angulatus, basi convexus. Apertura subobliqua, lunata, marginibus distantibus, callo nitido tenuique junctis, supero convexo-declivi, basali regulariter arcuato, columellari anguste in trianguli forma expanso, subincrassato. Peristoma acutum, rectum.

Diam. maj. 37, min. $30\frac{1}{2}$, alt. 23, alt. apert. oblique $17\frac{1}{2}$ mill.

Hab.: Antsianaka Country (E. Perrot).

Very distinct from *Hemiplecta Balstoni*, Angas, *H. Cleamesi*, E. A. Smith, and *H. formosa*, Anc., all also from Madagascar.

Hemiplecta profuga Anc.

Testa deppressa vel subgloboso-depressa, tenuis, perforata, nitida, supra subsericea, luteo-cornea, infra angulum medianum zona fusca angustaque cingulata. Spira plus minusve convexa, conoideo-depressa, obtusa. Anfractus 5- $5\frac{1}{4}$ convexiusculi, regulariter crescentes, oblique obsoleteque lineis incrementi confertis vix sculpti, supra passim et inconspicue subgranulati, sutura parum profunda discreti, ultimus ante medium angulo ad aperturam paulatim evanescente aut subrotundata cinctus, basi convexior. Apertura subobliqua, lunata, transverse irregulariter oblonga, extus subangulata, marginibus remotis, basali antice subsinuato, columellari in trianguli forma supra perforationem circularem et minutam anguste dilatato.

Diam. maj. 22, min. $18\frac{1}{2}$, alt. apert. oblique 8 mill.

Hab.: Antankaratra, N. Madagascar (Humblot).

This is allied to *H. oleata*, but is much smaller, more depressed and of lighter color. The sculpture also is more obsolete.

Macrochlamys granosculpta Anc.

Testa perforata (perforatio parva, sed aperta, circularis), tenuis deppressa, oleoso-micans, sordide luteo-cornea, vix lineis incrementi notata, striis confertissimis spiralibus passim, sed ad suturam praesertim, granulosis decussata, apice laevi. Spira depresso-sub-

conoidea, obtusa. Anfractus $4\frac{1}{2}$ convexiusculi, regulariter crescentes, sutura appressa, superficiali; ultimus suprà convexiusculus, infrà convexior. Apertura subobliqua, lunata, sat ampla, transverse oblonga. Peristoma acutum, marginibus distantibus, columellari in trianguli forma everso.

Diam. maj. 15, min. 13, alt. $8\frac{1}{4}$, alt. apert. oblique $7\frac{1}{2}$ mill.

Hab.: Antankaratra Country, N. E. Madagascar (Humblot).

The two specimens I have seen of this species probably are young ones, altogether the species is quite distinct from any other from Madagascar on account of its peculiar sculpture.

Macrochlamys Humbloti Anc.

Testa anguste perforata, conoideo subdepressa, tenuis, nitidissima, fusco vel purpureo-cornea, zona pallida, albescente, dilataque infra suturam ornata, sublœvigata, infrà lineis incrementi radiantibus obsolete notata et sub valida lente exiliter striis spiralibus incisula. Spira conoidea, subobtusa. Anfractus $5\frac{1}{2}$ regulariter et sat lente accrescentes, convexiusculi, sutura levi, appressa; ultimus suprà convexo-declivis, infrà convexus, subdepressus. Apertura parum obliqua, lunata, truncato-oblonga. Peristoma simplex, marginibus distantibus, columellari minute in trianguli forma expanso.

Diam. maj. $12\frac{1}{2}$, min. 12, alt. 8, alt. apert. oblique 6 mill.

Hab.: Antankaratra Country (Humblot).

Quite unlike the other species hitherto recorded from the island, the sutural white band being an unusual feature in the genus.

Helicophanta Alayeriana Anc.

Testa imperforata aut vix subrimata, depressa ovato-globosa, solidula, primum lœte fulva et inconspicue griseo multifasciata, deinde in ultimo intense brunnea et paulatim nigricans, ac præter zonam pallideorem initio ultimi anfractus suprà peripheriam concolor, epidermide nigra glutinosa decidua induta. Spira brevissima, convexa, obtusa, apice subplanata. Anfractus 4, celerrime accrescentes, convexiusculi, sutura impressa in ultimo sublacerata divisi; embryonales tenuiter oblique striati, penultimus granulis parvis et elongatis irregulariter asperatus, ultimus ab initio granulis destitutus, irregulariter plicatus, maximus, inflato-depressus, ad aperturam superficialiter atque spiraliter submalleatus, basi convexus. Apertura perobliqua, diagonalis, late ovalis, sublunata, intus atro-cyanea, margaritacea, nitida. Peristoma incrassatum, expansum, basi breviter

reflexum, hepaticum, margine columellari crasso, albo, nitido, dilatato, medio late et indistincte subtuberculato, parietali albescente, callo nitido crassiusculo obtecto.

Diam. maj. $69\frac{1}{2}$, min. 52, alt. 41 mill.

Hab.: Bora County, S. Madagascar (Sikora).

This is a beautiful species, between *H. gloriosa* Pfeiffer and *H. Ibaraoensis* Angas, but nearer to the latter one. It is however smaller, more globose, the aperture is larger, of a more oblique shape and the columellar margin is thicker.

Ampelita Robilliardi Angas.

This does not appear to be a very variable species. The shell is more or less depressed and the upper line is sometimes wanting.

Hab.: Fort-Dauphin, S. Madagascar (F. Sikora).

Ampelita Madagascariensis Lam.

Hab.: Fort Dauphin, S. Madagascar.

Ampelita gonostyla Ane., f. major.

Hab.: Bora Country, Madagascar (F. Sikora).

The specimen is larger and has a bluish lip, thicker than in the typical form.

Leucotænius ellipticus Ane.

Testa elliptico ovalis, glandiniformis, solida, alba, strigis subrectis fuscis nonnullis angustisque passim pieta, subobliqua confertim costulata, costulis infra medium ultimi anfractus evanidis. Spira satis producta, regulariter conoideo-attenuata, obtusa. Anfractus $8\frac{1}{4}$ subplani, regulariter crescentes, sutura subirregulari propter costulas; ultimus oblongus, dorso convexo-attenuatus. Apertura subrecta, pyriformi-ovalis, superne angulata, lactea. Peristoma vix iucrassatum, obtusiusculum, basi leviter effusum, ad columellam late dilatum ac suprà perforationum angustam reflexum, marginibus remotis, callo nitido junctis.

Long. 54, lat. $23\frac{1}{2}$, alt. apert. 25 mill.

Hab.: Andrahomana, S. Madagascar (Sikora).

I at first supposed this species might be *L. Favanni* Lam., var. β elongatula, of Crosse (Journ. de Conch., 1868, p. 185), also found in southern Madagascar, but the present form is quite different in shape, number of whorls and sculpture from the true *L. Favanni* Lam., the latter being similar in sculpture to the *Bulimulus dealba-*

tus var. *Ragsdalei* Pilsbry. It is the fourth species recorded of the genus, the others being :

L. Favanni Lam.

L. crassilabris Gray.

L. Procteri G. B. Sowerby.

The latter is much like a dwarfed example of *Favanni*, but is shorter and more conic.

Clavator Balstoni Angas.

Hab.: Imerina (F. Sikora); also Antankaratra Country (Humblot).

The specimen of Imerina is shorter and more ventricose than others I have seen.

Clavator Balstoni Angas, var.? *herculea* Anc.

Testa *eximiæ* magnitudinis; differt a *Cl. Balstoni* Angas, non solum statura insigni sed etiam spira magis producta, anfractibus 9 (nec 8), testa magis elongata, paulo solidiore, apertura magis incrassata, margine columellari longiore, crasso, summo subacuto.

Long. 144, diam. $45\frac{1}{2}$, alt. apert. 48 mill.

Hab.: N. W. Madagascar (Humblot).

Owing to the variability of the species, I dare not separate this very large and remarkable specimen from *Cl. Balstoni*, which is looked upon by some conchologists as a synonym of *Cl. eximius* Shutt., but considered as distinct by Crosse & Fischer; altogether it might prove to be a different species.

(To be concluded).

LIST OF LAND MOLLUSCA FROM THE NEIGHBORHOOD OF
SAPPORO, YESSO.

BY HENRY A. PILSBRY AND ADDISON GULICK.

A number of land shells collected by Mr. Paul Rowland at and near Sapporo, in Ishikari province, Yesso, and submitted to us for study, adds to our scanty knowledge of the Hokkaido species.

Eulota (Euhadra) peliomphala var. *septentrionalis* (Ehrm.). Mt. Moiwa, two miles from Sapporo, and Maruyama, $1\frac{1}{2}$ miles from the same place. Specimens from the former place are typical in color, having two broad dark bands and an umbilical patch. At the second locality two of three shells have a narrow band above the upper wide one, and the third has opaque creamy streaks, interrupting the

bands, as in ordinary *peliomphala*. All have the characteristic dark apex.

Eulota (Euhadra) blakeana (Newc.). Mt. Moiwa.

Eulota (Mastigeulota) gainesi Pils. Maruyama.

Eulota (Mastigeulota) gainesi var. *gudeana* Pils. Sapporo Park.

Clausilia micropeas var. *hokkaidoensis* Pils. Mt. Moiwa.

Clausilia rowlandi n. sp. Garukawa, 10 miles from Sapporo.

This is a very distinct new species of *Euphædusa*, named in honor of Mr. Paul Rowland.

Cochlicopa lubrica (Müll.). Garukawa.

Pyramidula pauper (Gld.) Yubari, 50 miles from Sapporo.

Kaliella sp. Mt. Moiwa. A large species, identical with Mr. Hirase's no. 678.

Succinea lauta Gld. Maruyama.

Helicina hakodadiensis Hartm. Mt. Moiwa.

The *Kaliella* is one which has been the subject of some correspondence between one of us and Mr. G. K. Gude, and there seems to be no doubt that it is an undescribed form. The new *Clausilia* will be described and illustrated in "Additions to the Japanese Land-snail Fauna," No. 7. The range of *Helicina*, *Eulota pel. septentrionalis* and *Clausilia* is extended some distance northward by Mr. Rowland's collection.

UNIO POPEII, LEA, IN NEW MEXICO.

BY T. D. A. COCKERELL.

In the list of New Mexico mollusca the genus *Unio* has not appeared, but I always hoped that some species would turn up in the eastern portion of the Territory. When recently at Roswell, in the Pecos Valley, Miss Bessie Peacock, of that town, brought me some single valves of a *Unio* which she had found in North Spring river, Roswell. I was, of course, greatly interested; and next day, guided by Miss Peacock, visited the place and had the good fortune to find a complete specimen. The shells are fresh and the species is evidently still living in the river.

I sent the specimen I had found to Mr. C. T. Simpson, who kindly reports as follows: "This is *Unio popeii*, Lea, and it is quite a long way out of its known range. The type came from the Rio Salado, a tributary of the Rio Grande, and since that was found other speci-

mens have been taken in Southwestern Texas. A few years ago Dr. Edgar A. Mearns collected it abundantly near Ft. Clark, Southwestern Texas, and obtained a number of living specimens, which he sent to me. Some of these were gravid and showed it to be a true *Unio*."

A NEW VARIETY OF GLYPTOSTOMA NEWBERRYANUM.

BY F. W. BRYANT.

G. newberryanum var. *depressum*.

This variety differs from typical *Glyptostoma newberryanum* (W. G. Binney) in being very much depressed, the altitude of shells with an equal number of whorls being less than two-thirds that of Binney's species. The diameter is correspondingly reduced. The aperture is also less round than in *G. newberryanum*. A specimen measures, alt. 11, diam. 27 mm.

Dead shells of this variety are found in abundance on the bluffs north of Ensenada, Lower California.

It has also been collected by Mr. Henry Hemphill near Wilmington, Los Angeles Co., California.

THE MANUFACTURE OF PEARL BUTTONS FROM FRESH-WATER MUSSELS.

In the manufacture of pearl buttons the centre of activity has shifted from the China Sea to the river towns of the Mississippi. Altogether unknown in this region a dozen years ago, this industry has grown to such proportions that it now employs the services of thousands of people, and the output has become so great that it materially affects the button market of the world.

About twelve years ago a German buttonmaker named Boeple wandered into Muscatine from the old country. He saw for the first time the mussel shells of the Mississippi river. He examined them closely and expressed the opinion that they were good material for buttons. Up to this time fresh-water shells were considered unsuitable for any such use, and authorities on the subject were naturally skeptical in regard to Boeple's opinion of their usefulness. He persisted in claiming that the "niggerhead" mussel from the waters of the Mississippi river would make, if properly handled and finished, the finest pearl buttons yet produced. He took some

specimens to the factories at Waterbury, Conn., and after considerable experimenting one concern there determined that with some changes in their machinery the shell of the strange mussel from the "Father of Waters" would make a button to compete with the best of those from other parts of the world.

First one concern and then another began to use the Mississippi shell, until the foreign one was almost abandoned. In the beginning the shells were shipped east in the rough and prepared for use after their arrival there, but the freight rates were so high that one enterprising firm soon shipped that part of its machinery which makes the "blanks" out to Muscatine, and, what generally results when some pioneer leads the way to a good thing, others soon profited by the example and came also. The industry has spread both up and down the river, until almost every town of any importance, from St. Paul, Minn., to Alton, Ill., is now engaged in some form of the industry.

The manner of catching the mussels is interesting. A fisherman equips himself with what is known to the clan as a "John boat." This is a flatboat on the order of a scow, about 20 feet long and $3\frac{1}{2}$ feet wide. Upon the inside of the boat are placed eight uprights, which are between three and four feet high and have crotched tops. Four of the uprights are placed on each side of the boat, at just enough distance apart to accommodate the four 10-foot pieces of inch gaspipe that rest upon them. To each of the gaspipes are attached 20 four-foot stagons, similar to those used on an ordinary trout line, and each stagon has four hooks, with four prongs.

The fisherman goes out in his "John boat" with as much confidence as if it were the finest craft afloat. Once in the stream, he casts his gas-pipes, one by one. As the hooks drag along the bottom of the river they come in contact with the open shells of the mussels, which immediately close up on them. Thus attached, they are brought to the surface and taken off. The distance the hooks are dragged each time depends altogether on the thickness of the bed, and varies from three boat-lengths to an eighth of a mile.

The rivers of Arkansas are said to be so thick with mussel beds that they crop out of the water when it is low. The men put on rubber boots and shovel the shells into the boats. In the Upper Mississippi district, shells are quoted in car-lots, ranging from 15 to 30 tons in weight, but the Arkansas dealers have astounded everybody in the business by sending out quotations on 500-ton lots and

promptly filling all orders sent them. The men sell the mussels to the button factory operators at so much per 100 pounds. The wages they make depend upon their diligence and the luck they meet with in getting in a thick bed, but range from \$1.50 to \$5 per day. There is one big mussel bed near Canton, Mo., about eight miles in length.

The process of making the shells into buttons is interesting. The shells are first cut up into blanks the exact size the buttons are to be; then they go to the grinder, a machine which grinds the black back off of them; after that to the facing machine, which cuts the face on them; next to the backer, which bevels the back; then the drill, which puts in the eye-holes; from here they go to the polishing room, where the glossy finish is put upon them; after that they are sorted, put on cards and boxed up.

There are about 40 factories in Muscatine, and the amount paid out weekly in wages is \$10,000. There are factories in Davenport, Fort Madison, Burlington, Quincy, LaGrange, Canton and many other points.

There is an added interest in the business of mussel fishing on account of the likelihood of finding pearls. It is not an uncommon thing for a fisherman to find a pearl valued at \$100, and one lucky fellow found a beauty which sold for \$5,000. Every follower of the business has a little bottle filled with specimens, which eventually find their way to the market.—*Phila. Record.*

GENERAL NOTES.

CANTHARIDUS PERONII Phil. In this journal for May, 1901 (xv, p. 8), I noted that it was Perry who first gave a name to this species, *Bulimus carinatus*. I find that this name cannot stand on account of the earlier *Bulimus carinatus* of Bruguiere, and the name given by Philippi will be retained. In the same note, the second *i* was omitted from the name *Bulimus eximius* Perry, by typographical error.—*H. A. Pilsbry.*

ANGITREMA VERRUCOSA AT LAWRENCEBURG, INDIANA.—I am able to list an entire new shell to this locality, *Angitrema verrucosa* Raf. This shell had so far never been found in the upper Ohio, the mouth of the Wabash, 275 miles below this point, being its locality according to Say. I was fortunate enough to obtain 60 specimens of this shell, and send you a set for the collection.—*A. C. Billups.*



DR. JAMES G. COOPER.

THE NAUTILUS.

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No. 7.

DR. JAMES G. COOPER.

On the nineteenth of July, Dr. Cooper, a man prominent in the scientific history of Western America, died at his home in Haywards, California. For nearly fifty years he labored with zeal and earnestness for the advancement of zoölogical knowledge. Trained as a physician and for years engaged in the practice of his profession, he yet found time for work of lasting value in the domain of nature-study. He suffered from ill health for many years, yet as one of the pioneers in the western field, his name will be held in grateful remembrance for what he has done in zoölogical science.

His father, William Cooper, one of the founders of the Lyceum of Natural History, now the New York Academy of Sciences, was eminent as a naturalist. From him Dr. Cooper received the early training which in large measure prepared him for his later career. Born in New York, June 19, 1830, James commenced his school life at the age of ten years, while living with his family on a farm near Hoboken, N. J. On his way to school it was his delight to collect birds or shells or anything else in animate nature which he might find, thus showing those traits which were afterward a dominating factor in his life work. Later he studied medicine, and received his degree from the College of Physicians and Surgeons of New York in 1851. After two years spent in the city hospitals, he was appointed physician on a government survey for a railroad between St. Paul and Puget Sound. A part of his duty was to make zoölogical and botanical collections, and in this way he began the observations and discoveries for which the scientific world is permanently indebted to him. During the succeeding years he spent most of his time in col-

lecting on the Pacific coast. In 1855, after the abandonment of the survey, he was at Gray's Harbor, then at Whitby's Island, then for six weeks in the Santa Clara Valley, in California, after which he went to Panama to collect shells for his father, who wrote the article on West Coast Shells for the Pacific R. R. Reports. Until 1860, Dr. Cooper continued his field work on the Pacific coast, much of the time at his own expense. In that year he was appointed Zoölogist of the California State Geological Survey under Whitney. While engaged in this work, he collected along the coast from San Diego to Bolinas, as well as inland. His observations on the land birds were embodied in the report on Ornithology, edited by Professor Baird and justly regarded as "by far the most valuable contribution to the biography of American birds that has appeared since the time of Audubon." (Baird.) Dr. Cooper's report on Conchology still remains in manuscript form in the library of the University of California. This report contains information of the highest value, especially in its voluminous notes on geographical distribution.

Through the latter part of the Civil War, Dr. Cooper served as surgeon in the Second Cavalry, California Volunteers. In 1866, at Oakland, California, he married Miss Rosa M. Wells. His later life was spent in the practice of his profession, until, with failing health, he retired to Ventura county, then in 1875 to Haywards. Although no longer as active in collecting as in earlier years, his scientific work was continued with the ripe experience and knowledge of zoölogy which the years had brought him. Some of his later work was done for the State Mining Bureau in the identification of fossils, in the description of new species, and in the publication of a Catalogue of Californian Fossils. For the Academy of Sciences also, of which he was an early member and at one time vice-president, he performed valuable service, both in conchology and in palaeontology. Some of his latest papers were based on material collected by members of the Academy.

Dr. Cooper published more than forty papers on conchology between 1859 and 1896. His discoveries of new species and varieties of mollusks were numerous. Of the 116 new forms credited to him, 65 were described by Dr. Philip P. Carpenter, 16 by W. M. Gabb, 17 by Dr. Cooper himself, and the remainder by William Cooper, Gould, Bland, Newcomb and Tryon. It is noticeable that so few were described by Dr. Cooper. Owing to a lack of scientific books

and authenticated collections in California, he sent most of his new species to more favored workers for description. Dr. Carpenter says of the species collected by Dr. Cooper: "The diagnoses . . . published in the Proc. Cal. Ac. N. S. . . . should be credited to the zealous zoölogist of the survey, rather than to the mere artist-in-words who endeavors to represent their forms to the reader." Dr. Cooper described a few species collected by other workers in the field, but of these there is no enumeration at hand.

Dr. Cooper was a man of noble character and kindly disposition. He was tall and slender, not very fluent in conversation unless the topic under discussion was one of special interest to him. Many of the younger students of zoölogy in California remember with gratitude his aid so freely given them in their studies. Since his death, besides extended notices in the daily papers, there have appeared a memorial by Wm. H. Dall in Science for August 15, and one by W. O. Emerson, together with a list of ornithological papers, in the current number of the Condor. The last is the Bulletin of the Cooper Ornithological Club and contained in its first issue, 1899, a much longer account of Dr. Cooper's life work. A partial list of his conchological papers will be found in Bulletin 4, California State Mining Bureau. The present portrait is from a photograph taken in 1865, and was sent to the writer by Mrs. Cooper, who still lives in Haywards.

WILLIAM J. RAYMOND.

University of California, Oct. 15, 1902.

NOTICES OF NEW JAPANESE LAND SNAILS.

BY H. A. PILSBRY AND Y. HIRASE.

Mr. Nakada, who collected so successfully in the Bonin Is. (Ogasawara-jima), has now gone into western Hondo, through the provinces Echizen and Kaga, and continuing northward will collect in Noto and Sado Island. Among many other interesting discoveries, he has found *Sphyradium edentulum* Drap. (new to eastern Asia), *Bifidaria plicidens* Bs. (described from India), magnificent specimens of *Eulota (Euhadra) senckenbergiana*, one of the finest helices in the world, and many other beautiful shells.

Chloritis albolabris Pilsbry & Hirase, n. sp.

Shell depressed, the alt. about half the diameter, but slightly convex above, several earlier whorls being coiled in a plane, the tip of the apex turning down; umbilicate, the width of umbilicus about one-fifth that of the shell, thin but moderately strong, greenish, somewhat russet tinted above. Surface dull, marked with low growth-wrinkles, and set with *rigid, short, black-brown, tapering bristles*, arranged in oblique lines as usual, but in part irregularly placed. On the latter part of the last whorl the bristles stand nearly a half mm. apart. Whorls $4\frac{3}{4}$, convex, slowly widening to the last, which is fully double the width of the preceding whorl, is well rounded at the periphery and beneath, and descends slowly in front. Suture deeply impressed. Aperture quite oblique, widely lunate, the peristome white, narrowly reflexed, thickened with a narrow rim within, the ends approaching.

Alt. 9.6, diam. 20 mm.

Alt. 9, diam. 18 mm.

Yaku-shima, Osumi. Types no. 83883 A. N. S. P., from no. 958 of Mr. Hirase's collection.

This fine *Chloritis* needs comparison with no other Japanese species. The wide umbilicus, stiff, dark-colored bristles, and thick white lip, are conspicuous features differentiating it from other forms. (*Albolabris*, white-lipped.)

Eulota (Aegista) kobensis var. *gotoensis* P. & H., n. var.

Much smaller than *kobensis*, with narrower umbilicus; whorls $5\frac{1}{2}$; sculpture and color as in *kobensis*. Aperture more nearly circular, the lip thick and white, as in *kobensis*. Alt. 6.5, diam. 12 mm.

Goto, Hizen. Type no. 83877 A. N. S. P., from no. 969 of Mr. Hirase's collection.

E. kobensis (Schm. & Bttg.) has hitherto been known from Awaji, Setsu and Yamashiro, adjacent provinces, though the former is insular. The occurrence of a race far to the southwest is therefore interesting.

Eulota (Plectotropis) omiensis var. *echizenensis* P. & H., n. var.

Shell depressed, conic or low-conic above, convex beneath, umbilicate, the width of the umbilicus one-third the diameter of the shell; brown; surface nearly lusterless, sculptured with slight and

irregular growth-lines and bearing sparse triangular cuticular processes, nearly wanting in some individuals. Whorls 5 to $5\frac{1}{3}$, convex, the last angular at the periphery, the angle disappearing behind the outer lip, slowly descending below the angle of the preceding whorl. Aperture very oblique, rounded, about one-fourth of the circle excised by the preceding whorl. Peristome thin, expanded.

Alt. 4.5, diam. 7.3 mm.

Alt. 5, diam. 7 mm.

Arato, Echizen. Types no. 83879 A. N. S. P., from no. 752a of Mr. Hirase's collection.

This western race is distinguished from *omiensis* by its more conic, elevated spire, and sparser cuticular shreds.

Eulota (Aegista?) intonsa Pils. & Hirase, n. sp.

Shell depressed, somewhat lens-shaped, umbilicate, the umbilicus less than one-fourth the diam. of the shell; thin; light brown with some indistinct corneous streaks, and corneous around the umbilicus. Surface somewhat shining, rather roughly papillose-striate, the last whorl densely set with short, hair-like cuticular processes, in part rubbed off. Whorls 5 to $5\frac{1}{2}$, slowly widening, somewhat convex, the last whorl strongly angular at the periphery, much more convex below the angle than above, shortly descending in front. Aperture oblique, oval; peristome thin, the upper margin slightly expanded, outer and lower margins expanded and narrowly reflexed, the terminations converging, parietal wall covered with a thin varnish.

Alt. 6, diam. 12 mm.

Alt. 5.3, diam. 11.5 mm.

Suimura, Awa (Shikoku). Types no. 83378 A. N. S. P., from no. 960 of Mr. Hirase's collection.

A species with much the contour of *Plectotropis*, but more like *Aegista* in sculpture and texture, so that both of us are disposed to refer it to the latter group. It is quite unlike any Japanese species yet described. The aperture reminds one somewhat of *Trachia*. (*Intonsus*, unshaven).

Pyramidula conica Pils. & Hir., n. sp.

Shell umbilicate, conic, rather thin, dark purplish-brown, closely, finely and rather irregularly striate. Whorls $4\frac{1}{2}$, very convex, separated by a deep suture, the last rounded at the periphery and beneath.

Aperture oblique, rounded, about one-fourth of the circumference excised at the parietal wall by the preceding whorl; peristome simple and thin, the columellar margin a little dilated. Alt. 1.5, diam. 2.7 mm.

Suimura, Awa, Shikoku. Types no. 83884 A. N. S. P., from no. 961 of Mr. Hirase's collection.

This species is excessively similar to the common European *P. rupestris*, type of the genus *Pyramidula*. In fact, if found in the western Palæaretic area, it probably would not be separated more than as a subspecies. However, the whorls are more tubular, especially the last one. The Chinese *Pyr. orphana* (Heude) is also closely related, but comparison with a specimen received from Père Heude shows it to be perceptibly rougher and with the last whorl more depressed.

The species of the typical group of *Pyramidula* differ from those of the more widely distributed section *Gonyodiscus* in wanting regular rib-striæ. This is more constant than the degree of elevation, which varies widely in both groups. Some large forms, such as *Pyr. solitaria*, also want the ribbed sculpture. It has elsewhere been shown that the teeth and jaw of *P. rupestris* are like those of the ordinary discoidal species; so that Dr. von Moellendorff's hope that it will prove generically distinct does not seem likely to be realized.

Macrochlamys kagaensis Pils. & Hir., n. sp.

Shell very narrowly umbilicate, globose-depressed, thin, greenish-yellow. Surface very glossy and smooth, marked with faint growth-wrinkles, the inner whorl densely and finely engraved with spiral striæ, which are obsolete or nearly so on the last whorl. Whorls $4\frac{1}{2}$, rather rapidly increasing, the last about double the width of the preceding, rounded peripherally, convex beneath, impressed at the axis. Suture shallow, edged by a fine white line. Aperture slightly oblique, wide lunate, the peristome thin and simple, slightly dilated at the axial insertion. Alt. 9.5, diam. 15 mm.

Hakusan, Kaga. Types no. 83881 A. N. S. P., from no. 974 of Mr. Hirase's collection.

A fine large species, allied to *M. dulcis* Pils., but much more globose. *M. perfragilis* Pils., from Oshima, is very similar in form, but has an even smaller umbilicus and more oblique aperture, besides wanting the incised, clear-cut spirals on the inner whorls.

Microcystina nuda P. & H., n. sp.

Shell minute, imperforate or nearly so, depressed, yellowish, glossy and smooth. Whorls 4, slowly increasing, the last indistinctly and obtusely subangular at the periphery, above the middle; impressed around the axis. Aperture lunate, subvertical, the lip simple, acute, dilated at the axis, the columellar margin a little thickened. Alt. 1.2, diam. 2.6 mm.

Hakusan, Kaga. Types no. 83880 A. N. S. P., from no. 973 of Mr. Hirase's collection.

Apparently related to the smaller *M. sinapidium*, both belonging to Reinhardt's group *Discoconulus*. (*nudus*, naked).

Kaliella kugaensis Pils. & Hir., n. sp.

Shell subperforate, low-trochiform, yellowish and glossy. Surface marked with faint growth-lines, the second whorl delicately and very minutely costellate; base showing some faint spirals. Whorls 5, somewhat convex, slowly increasing, the last angular at the periphery, convex below. Aperture lunate, oblique, the peristome simple and thin, columellar margin subvertical, narrowly expanded. Alt. 2.4, diam. 3.2 mm.

Hakusan, Kaga. Types no. 83882 A. N. S. P., from no. 971 of Mr. Hirase's collection.

A shell almost identical in contour with *K. okiana*, but smooth and glossy, and a little larger.

Kaliella gudei Pils. & Hir., n. sp.

Shell large for the genus, perforate, conic, thin, pale yellowish, somewhat translucent, smooth except for slight, irregular growth-lines. The outlines of the spire are slightly convex, nearly straight, last whorl with a narrow, thread-like peripherel keel, which ascends the spire and is visible as a narrow border above the suture. Whorls 6 to $6\frac{1}{2}$, quite convex, the last convex above and below the keel, slightly impressed around the perforation. Aperture truncate-lunar, the lip simple, columellar margin dilated, reflexed. Alt. 5, diam. 6.2 mm.

Kayabe, Ojima. Types no. 81922 A. N. S. P., from no. 678 of Mr. Hirase's collection. Also Hakodate, Ojima. Mt. Moiwa, two miles from Sapporo, Ishikari (Paul Rowland); all in Yesso.

This is the largest Japanese species, and one of the largest of the

genus. It is related to *K. (?) ceratodes* Gude, but that is a much smaller and smoother shell. *K. gudei* was at one time identified with *H. labilis* and with *H. pupula* of Gould, both described from Hakodate, but Mr. G. K. Gude directed attention to its distinctness from these species.

CONTRIBUTIONS TOWARDS THE KNOWLEDGE OF THE MOLLUSCA OF MADAGASCAR.

BY C. F. ANCEY.

Clavator Johnsoni E. A. Smith.

Hab.: Central Madagascar (Humblot).

Clavator obtusatus Gmelin.

Hab.: Fort Dauphin, S. Madagascar (F. Sikora). Also found at the northern end of the island (Alluaud).

Clavator Humbloti Anc.

Testa magna, imperforata, elongato-attenuata, solidula, epidermide fusco lutescente infrà transverse et exiliter fusco multifasciata induta, sub epidermide alba, nitidula. Spira regulariter usque ad apicum attenuata, elongata, obtusa. Anfractus 9? (supremi fracti), regulariter crescentes, convexiusculi, sutura mediocri in ultimis minute et leviter subcrenulata discreti, longitudinaliter striis confertis incrementi exarati, in 5 inferis lineis spiralibus impressis magis distantibus decussati; ultimus elongatus, inferne attenuatus. Apertura subobliqua, basi leviter recedens, irregulariter oblongo-attenuata, superne angulata, basi ampliata, intùs cœrulescens. Columella antice angulatum producta, intùs contorto-subplicata, crassiuscula. Peristoma obtusum, suprà columellam dilatatum et adnatum, marginibus distantibus, callo nitido basi prœcipue conspicuo junetis.

Long. 95, diam. $27\frac{1}{2}$, alt. apert. 31 mill.

Hab.: Antankaratra Country (Humblot).

This fine species appears to be allied to *Cl. Moreleti* Desh., but is much larger and is very distinct.

Pachnodus rufoniger Reeve.

Hab.: "Montagne d'Ambre," Diego Suarez; Antankaratra (Humblot).

Planorbis Madagascariensis E. A. Smith.

Hab.: Vinaninony and Fenoarivo.

Planorbis trivialis Morelet.

Hab.: Same localities.

Acroptychia aequivoca Pfeiffer.

Hab.: Antankaratra (Humblot).

I think that *A. manicata*, Cr. and F. is the same as this.

Hainesia crocea Sowerby.

Hab.: Andrahomana, S. Madagascar (Sikora).

I do not see that any precise locality was ever given for this species, erroneously ascribed to Mauritius by Benson.

Cyclostoma carnicolor Anc.

Testa pro genere mediocriter sed profunde umbilicata, globoso-conica, solida, suprà parùm, inferne magis nitida, superne spiraliter multisulcata, præterea lineis incrementi sub lente decussata, carnea vel rubella, ad apicem luteola, fascia fuseo-cœrulea infrà peripheriam cineta. Spira conoidea, apice sat minuto, obtuso. Anfractus $5\frac{1}{2}$ convexo-rotundati, ultimus bene rotundatus, subtùs fasciam lèvigatus, dein iterùm circà umbilicum et in umbilico ipso confertim concentrice liratus, antice breviter ascendens. Apertura albida, intùs candida vel luteola, fascia transmeante. Peristoma expansum, marginibus approximatis, callo subemarginato junctis, columellari dilatato-reflexo. Operculum testaceum, sordide album, anfractibus 4, nucleo subcentrali.

Diam. maj. $23\frac{1}{2}$ – $26\frac{1}{2}$, min. 18–20, alt. 21–26 mill.

Hab.: Andrahomana (Sikora).

Nearly related to *C. asperum*, Pot. and Mich., but much less rugose and of different color. It may be the southern analogue of *asperum*, which lives in the northern end of Madagascar.

Cyclostoma Alayerianum Anc.

Testa globoso-turbinata, pro genere anguste umbilicata, parùm crassa, spiraliter confertim acutique lirata, liris in ipso umbilico conspicuis, infrà peripheriam ultimi anfractus lèvioribus, ochraceo-fulvescem, fasciis angustis 2 fuscis, quarum una angulo superiore aperturæ incipit, altera minus conspicua suprà peripheriam ultimi cingulata. Spira turbinata, apice lèvi, obtusulo. Anfractus 5 valde convexi, sutura profunda, inferne minute plicatula, ultimus

rotundatus, ad finem brevissime et leviter subascendens. Apertura parum obliqua, subcircularis, intus luteola. Peristoma subinterruptum, anguste, ad columellam paulo magis expansiusculum.

Diam. $9\frac{1}{4}$, alt. $9\frac{1}{2}$, alt. apert. vix 5 mill.

Hab.: Region of Fort Dauphin, S. Madagascar (F. Sikora).

Although this small species bears some resemblance with others, like *C. undatoliratum* Boettg., etc., still I cannot identify it with any of them.

Cyclostoma obsoletum Lam.

Hab.: Province of Boeni.

Cyclostoma filostriatum Sowerby.

Hab.: Fort Dauphin (F. Sikora).

About the geographical distribution, it may be of interest to note that *Helicophanta magnifica* has been found in Imerina, where it is said to be very scarce (Sikora), and *Heliophantia cornu-giganteum*, Chemnitz, in southern Madagascar, near Fort Dauphin (Sikora).

NOTE ON NEOCORBICULA FISCHER.

BY W. H. DALL.

In a small collection of freshwater shells from Uruguay, recently received, are specimens of *Corbicula obsoleta* Deshayes and *C. limosa* Maton. The latter is the *C. variegata* Orbigny, and the type of Fischer's section *Neocorbicula*, proposed for the American Corbiculas, which have separate siphons and a small pallial sinus, while the European types of the genus *Corbicula* have an unsinuated pallial line.

Several of the specimens above mentioned had the animal matter dried up within the shell, and in removing this it was discovered that the shells contained a large number of neionic young of varied size, some nearly two millimeters in length and already showing radiating lines of color. There were 15 to 20 of the young fry in each individual, and while the dried matter gave no distinct indication of the original arrangement, the fry in each case were in the umbonal cavities.

I have run over the literature and manuals and have not found any reference to viviparity in *Corbicula* or *Cyrena*, though of course it is well known in the allied *Sphaerium* and *Pisidium*. If it is a characteristic of the Old World *Corbiculas*, it is singular that it has not been hitherto noted.

The prodissococonch in these young shells is rounded, polished and translucent, and presents no remarkable peculiarities.

If the brooding of the neponic young in a marsupial sac is a further point of distinction between the New and Old World forms, it is probable that it may be regarded as raising the value of the subdivision to higher than sectional rank.

"PYRAMIDULA" ELRODI AND EPIPHRAGMOPHORA CIRCUMCARINATA.

BY ROBERT E. C. STEARNS.

In connection with my remarks upon the above-named forms in the October number of THE NAUTILUS, and Dr. Pilsbry's comments that follow, he says: "The difference between Dr. Stearns' views and my own, of the affinities of the two *Helices*, may be due to his having, perhaps, no examples of *circumcarinata* at hand for direct comparison with *elrodi*." This suggestion is correct. I have not seen an example of *circumcarinata* for ten years, and only a single specimen of *Elrodi*, that heretofore referred to by me.

The dominant features of these shells are surprisingly alike. The many though less conspicuous characters indicated by Dr. Pilsbry in their bearing on the distinctive point, must therefore be accepted. The remarkable similarity exhibited between the forms in question are presumptively, as Dr. Pilsbry observes, the result of similar environmental conditions "acting upon organisms originally diverse, and indeed not closely related."

Closeness of relationship or otherwise, among land-snails inhabiting the same geographic or physiographic area, though the area may include a broad extent of territory, is another and very interesting question.

Regarding the relations of the *strigosa* group of snails, I have for a long time held the opinion that it was decidedly out of place in

Pyramidula, and am pleased to learn on the authority of Dr. Pilsbry that the proper position of this large and varied group will soon be made known.

Los Angeles, Cal., October 12, 1902.

GENERAL NOTES.

“SLUGS” AS MEDICINE.—While in Port Antonio, Jamaica, last March, I collected some *Veronicella sloanei* Cuv., and having nothing to put them in, wrapped them in paper and left them on a table in my room at the hotel. During my absence they escaped and began crawling around, much to the disgust of the colored chambermaid who happened in about that time. On my return she filed a vigorous protest against the “nawsty things,” and wanted to know what I intended to do with them. She then informed me that they were good for all forms of lung trouble and asthma. They are used as follows: Take a green cocoanut, cut off the end, and drop a good sized “slug” into the milk, in which it will dissolve. The milk is then drunk and is a “sure cure for asthma.”

It would be interesting to know whether this is a survival of the old European belief in the efficacy of the slime of “slugs” in pulmonary troubles, carried to the island by the early English settlers, or whether it is a part of the African pharmacopœia introduced with the slaves.—GEO. H. CLAPP.

NOTES ON *HALIOTIS RUFESCENS* Sw.—For several months a company of Japanese fishermen has been engaged in collecting abalones on San Clemente Island, and drying the animals for the Japanese and Chinese markets.

Among the shells sent from this island to San Pedro for shipment I recognize quite a large number of fine *Haliotis rufescens* Sw., which is not, or is only very rarely found along the shore of the mainland of southern California at the present time.

Last year I collected an interesting series of this beautiful shell in the shell-mounds on San Nicolas Island, but most specimens of the shell in those mounds are broken or in an advanced stage of disintegration.

Recent collectors of abalones report living specimens of the red abalone very rare on San Nicolas Island.—HENRY HEMPHILL.

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No. 8.

SURFACE SCULPTURE IN ANCYLUS.

BY BRYANT WALKER.

Owing to the simple character of the shell, which presents but few of the salient specific features which enable the more specialized groups to be readily determined, the North American *Ancylus*, like the *Succineas*, have received but scant attention from our collectors, and great confusion exists in regard to the identification of nearly all the described species.

The species of the earlier authors were based almost wholly upon the shape, contour of the slopes and position of the apex. The surface sculpture was as a rule overlooked. With the exception of the few species characterized by radial ribs or incised lines, in only four of the eastern American forms is the character of the surface mentioned at all in the original descriptions, and then only with reference to the growth lines.

Bourguignat, in 1853 (*Journal de Conchyliologie*, IV, p. 63), was the first to point out the apical scar as a peculiarity of the genus, and Pilsbry (*NAUTILUS*, IX, p. 139) is the only American author who has noticed its presence in any American species. It is present in all of them, but is much less conspicuous in those species which group around *A. fuscus* than in those of which *A. ricularis* is the leading form.

Pilsbry also was the first (*loc. cit.*) to call attention to the fact "that nearly all specimens are more or less coated with foreign matter, sometimes calcareous, but generally ferruginous (which) must be removed before the color and finer sculpture can be observed," and to give a practical method for cleaning the shells.

A recent study of the eastern North American species has developed some unexpected peculiarities in regard to their surface sculpture, which are of value in determining many of the species and which may prove to be of importance in reference to their phylogeny and classification.

In studying the *Ancylia*, it is necessary to have the shells thoroughly cleaned with dilute oxalic acid and to use a compound microscope of at least 50 diameters; not unfrequently a power of 100 diameters is required, especially with the smaller species, to reveal the characteristic sculpture. Under a simple lens of 10 diameters the shell, when cleaned, appears to be smooth and shining, but under a higher power a more or less developed system of sculpturing is visible in nearly every species. This consists of two elements: first the concentric lines of growth, and second, a radial sculpture more or less evident, which in its fullest development, as in *A. peninsulae* and *eugraphus*, presents a series of fine, conspicuous, radial riblets extending from the apex to the peritreme.

The concentric sculpture formed by the growth lines is not usually very strongly developed. It never presents the regular clear-cut striation such, for instance, as is presented by *Planorbis trivolvis*, but is irregular and more or less indented, varying in the different species.

The radial sculpture in all the species examined, when present, consists of fine transverse elevations varying from very fine, irregular, discontinuous ripples to continuous riblets covering the entire surface. When present at all, their position is radial.

The only species in which any other kind of radial sculpture has been noticed is the *A. borealis* Morse, in which the surface is marked "with fine, regularly interrupted radiating lines." It is not expressly stated that these are incised, but such would seem to be the inference. Unfortunately no authentic specimens have been accessible for examination.

There is a large degree of individual variation in the development of the radial sculpture, even in those species which have been established upon its presence and in which it is best developed. *A. peninsulae* is the only one in which it seems to be uniformly present. *A. filosus* is frequently nearly smooth and, judging from specimens from both the Coosa and the Cahawba, the radiating sculpture is decidedly irregular. The same holds true in regard to *A. eugraphus*. *A. ovalis* has not been examined.

On the other hand, in nearly all the so-called smooth species there is a distinct tendency toward the formation of a minute, transverse, irregular and discontinuous rippling of the surface, which, especially on the lateral slopes, tends to form irregular riblets extending anteriorly. The median portion of the anterior slope is less apt to be affected in this way.

While it is, as yet, too soon to speak positively, it seems possible that an examination of a large amount of material may lead to discarding the presence of a well-developed radial sculpture, unaccompanied by other peculiarities of size and shape, as a ground for specific distinction. The *A. excentricus* Morelet may be cited as an example of this kind. It is described as smooth or with very fine concentric lines only, and apparently on this ground alone is distinguished from the *A. radiatus* Guilding. Bourguignat (J. de C., iv, p. 155), on other grounds, only allows it varietal rank; but Crosse & Fischer (Moll. Mex., ii, p. 37) hesitate to follow him on account of the absence of the radiating striae, which are so prominent in *radiatus*. An examination of specimens of *A. excentricus* from Texas, collected by Singley, shows that in all of them the radiating sculpture is incipiently present and that in some there are well-developed riblets present on the antero-lateral slopes, the median portion of the anterior slope being practically smooth. (See also Pilsbry, NAUT., iii, p. 64.) A larger series would probably necessitate the uniting of the two forms.

The most striking feature, however, in the radial sculpture of the *Ancylia* is the presence, in many of the species, of a circle of fine riblets or striae on the apex, radiating from the apical scar. These apparently have not been noticed before. When present in a species, they are invariably to be found, and that quite independent of the presence or absence of a radial sculpture over the entire surface, and they may be entirely wanting in species with a well-developed ribbed surface, as in *A. eugraptus*. When the radial sculpture is persistent over the whole surface, the riblets originate from these apical striae, but when that sculpture is not present, they cease a very short distance from the apex. This apical sculpture is characteristic of the more elevated species with an acute apex, of which *A. rivularis* is the leading form. The scar in these species is situated on the tip of a sharp, prominent apex and, with its circle of radiating ribs, is very conspicuous and easily observed.

In a large number of species, however, the apex is smooth and the radial riblets when present originate below the apex. These are the wide, ovate or subcircular species, usually more or less depressed, of which *A. fuscus* may be considered the type. In these the apex is blunt and smooth and the apical scar is not conspicuous. In *A. peninsulae*, however, the riblets in some specimens seem to extend clear up to the scar, but not into it. While in this respect this species seems an exception to the rule, that the depressed species have the apical region smooth, nevertheless its affinities are all with that group, and in spite of the apparently intermediate character of its apical sculpture, it seems better to class it with them. A similar tendency, though much more feeble, has been observed in one set of *A. diaphanus*.

The eastern American species, so far as examined, fall into two natural groups characterized by their shape and contour as well as this difference in apical sculpture. Pilsbry has already indicated them (loc. cit.) on other grounds, and it is interesting to find that the distinction apparently also holds good on structural grounds of some importance.

The following list of eastern American species is arranged with reference to their apical character:

Apex striate.	Apex smooth.	Not examined.
<i>rivularis.</i>	<i>fuscus.</i>	<i>obscurus.</i>
<i>tardus.</i>	<i>diaphanus.</i>	<i>elatior.</i>
<i>parallelus.</i>	<i>excentricus.</i>	<i>calcarius.</i>
<i>shimekii.</i>	<i>holdemani.</i>	<i>borealis.</i>
<i>filosus.</i>	<i>eugraptus.</i>	<i>ovalis.</i>
	<i>peninsulae.</i>	

Any collector, who has any of the unexamined species as here listed, will confer a favor by communicating with the writer.

A NEW HAITIEN CHONDROPOMA.

BY JOHN B. HENDERSON, JR., AND CHAS. T. SIMPSON.

Chondropoma superbum.

Shell having a small umbilicus, usually truncated, subsolid, somewhat shining; whorls 7, the two nuclear ones smooth and waxy; those remaining in the truncated shell 4; sculpture consisting of

rather fine axial threads, becoming finer behind the aperture; suture narrowly canaliculate, its lower edge finely denticulate; last whorl decidedly solute, free about one-fifth of its length; aperture almost regularly oval, vertical when viewed from its outer edge, oblique when viewed from the front; outer lip heavy, rounded and well reflexed; inner lip narrower, scarcely reflexed above; base within the umbilical region with faint spiral liræ; color brownish white, marked with brown spots arranged in longitudinal and revolving series.

Opereulum paucispiral, finely ridged, calcareous without, horny within; nucleus excentric.

Length 25, greatest diameter 14, least diameter 11 mm. Length of aperture 10, diameter 7 mm.

Another shell. Length 21, greatest diameter 13, least diameter 7 mm. Length of aperture 9, diameter 6 mm.

Found on a high limestone hill back of Thomazeau, Haiti, many specimens, living and dead.

This species is somewhat closely related to *Chondropoma weinlandi* Pfeiffer, which is found on the plain about Thomazeau, but it is larger, solider, more finely developed and painted, and has the last whorl much more solute and the outer lip more solid and reflexed. It varies a good deal in size and color pattern. There are occasionally faint longitudinal brown bands, and the darker spots which are usually longest in a spiral direction may become angular, rounded or almost blunted into axial rows.

It is a magnificent species, often quite as beautiful as *C. magnificum*.

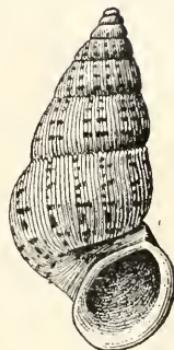
SOME NOTES ON THE NORTH AMERICAN CALYCULINÆ, WITH NEW SPECIES.

BY DR. V. STERK.

The genus *Calyculina* has been pointed out by T. Prime¹ without a name, and named by Clessin.² It seems well-defined, since no species have been seen which were in doubt whether to be ranged under *Sphaerium* or *Calyculina*.

¹ Mon. Corbiculidæ, 1865, p. iv.

² Mal. Bl. xix., 1870, p. 150, and used in "Cycladeen," p. 253.



One of the features, however, considered characteristic, and from which the generic name was derived, is not constant. The beaks are not always capped, or calyculate, and in *C. transversa*, *e. g.*, they are simply rounded, as a rule, while in all other species, examples with rounded, not calyculate, beaks, are occasionally found, and sometimes at a large percentage. As stated elsewhere, it seems that this is caused, at least partly, by the seasons during which propagation is effected.

It has been asserted, and repeated, that the Calyculinæ have a cyclical period of life, within one year, depositing their young in spring. This seems not to hold good. Of *Cal. transversa* Say, *e. g.*, I have collected specimens at all stages of growth, and also gravid animals in all seasons, also in midwinter, and nearly the same can be said of *C. partumeia*, *truncata* and *securis*. And among materials sent for examination from different places and collected at various seasons, the mussels were found of different ages and sizes.

Since the publications of T. Prime and Clessin, little has been said about our Calyculinæ. During the last eight years I had chances to examine many thousands of specimens, owing to the efforts and the kindness of a number of conchologists. Yet the materials extant are still insufficient, especially from the Southern and Western States. Most of the species seem to be rather variable, and some considerably so, in regard to size, shape, surface appearance and color, and some forms could be referred to certain species only after careful examination and often repeated comparison, and even then doubtfully in some instances. More materials from many localities are very desirable.

They preferably inhabit quiet waters, to which they are best adapted, with their thin and fragile shells. Pools, ponds, ditches, slow rivers and creeks often abound with them, where they are crawling among plants and dead leaves. In fast running streams, with coarse bottoms, they are scarce, and so along the shores of larger lakes.

So far as I know them now, the species are the following:

1. *C. elevata* Hald. A southern species, with comparatively strong shells. The specimens are not always so high and of such circular outlines as in T. Prime's figure. A rather small, but well inflated form from Kansas seems to range under this species.

2. *C. contracta* Pr. Seems to be a good species. Seen from

Alabama and Louisiana. Specimens from Kentucky (Bowling Green, collected by Miss Price) are slightly different in shape, being more rhomboid, but probably range with *contracta*.

3. *C. Hodgsonii* n. Somewhat like *contracta*, but rather larger, somewhat more elongated; the shell is thicker, the nacre whitish, the hinge stronger; the posterior end is not so markedly or so obliquely truncated. The surface is rather dull, the color a vivid yellow, to plumbeous around the umbones, in older specimens. It has some resemblance with *C. transversa*, but is less elongated, more equipartite, the shell and hinge are stouter, the superior margin and the hinge more curved, especially so the posterior lateral teeth.

Size: long. 14, alt. 11, diam. 6.5 mill.

From a mill pond at Albion, Ill., collected years ago by Mr. C. S. Hodgson. It is in many collections under various names, e. g., *Sphaerium aureum* Pr., from which it is very different. So well marked a form must be described and named, even if known from only one place, so far, and even if it should ultimately prove to be a variety, e. g., of *C. contracta*, which, however, is not probable. I take pleasure in naming it after its discoverer, Mr. Hodgson.

4. *C. transversa* Say. Widely distributed and common in all kinds of waters. Fairly constant in shape, but rather variable as to size and color.

5. *C. ferrissii* n. sp. Shell elongated, equipartite, rather well inflated, beaks in the middle, narrow, moderately prominent, somewhat inclined forward, slightly or not calculate; superior margin curved, sloping from the beaks anteriorly and posteriorly; scutum and scutellum slight but distinct, long and narrow; inferior margin well and regularly curved; anterior and posterior part rounded, without any angles, the former somewhat less high; surface with some irregular, not sharp, but partly rather deep striae, more or less arranged in zones, polished; color plumbeous around the beaks, with broad light yellow zones along the margins; shell thin, hinge fine, plate quite narrow, teeth thin and slight, the laterals placed at angles with the longitudinal axis, rather long; ligament fine and very long.

Size: long. 13, alt. 10, diam. 7 mill.

Hab.: Oklahoma City, Oklahoma, Arkansas, Frierson, Louisiana; in the former States collected by Mr. Jas. H. Ferriss, in whose honor the species is named, in the latter by Mr. L. S. Frierson.

So far as known, the present Calyculina is decidedly distinct, and

moreover, was found in company with *C. transversa*, which it resembles in being so elongated. But its beaks are not anterior, narrower and less full, the hinge margin is not so straight, and the anterior and posterior ends are rounded, not truncate.

6. *C. partumeia* Say. Widely distributed and decidedly variable, some forms being hardly recognizable. At Garrettsville, Ohio, Mr. Streator has found a form with exceptionally broad, full, rounded beaks, quite unlike those of a Calyculina.

7. *C. jayensis* Pr. (*Sphaerium jayanum*, in Mon. Corb.). One of the rarer species, and known from Indiana and Michigan to Wisconsin and Iowa. Seems to be valid.

8. *C. truncata* Linsley. Rather common, and somewhat variable. In regard to shape and surface appearance, it usually resembles more *C. partumeia* than *securis*. Yet in some forms the posterior end is rather obliquely truncated, and the beaks are rather strongly inclined towards the anterior. The mussel is more inflated, as a rule, than the dimensions given in Prime's description.

Clessin (Cycladeen, p. 246) says: "It appears to me somewhat doubtful whether *C. truncata* can be regarded as a good species. Around the type of *Cal. securis* are grouped several species (*Sph. contractum*, *rosaceum*, *sphaericum*, *truncatum*, *lenticula*), which, according to European principles, would unhesitatingly be regarded as varieties." In all probability, Clessin had insufficient materials on hand.¹ *C. truncata* has been collected in many places over a wide territory, and has been found distinct. Quite commonly, I have found *C. securis* and *truncata* associated, and the two often also with *C. partumeia*. *C. contracta* is evidently of another type. As to *rosacea* and *sphaerica* we refer to the following.

9. *C. rosacea* Pr. There is a small Calyculina with a thin, transparent, horn-colored, or almost colorless shell, narrow, moderately high beaks, which is evidently distinct from the other species. It is known from different places in Michigan, Illinois, New York and Virginia. For years it has been a stumbling block, since most forms did not agree exactly with Prime's description of *rosacea*, and yet they could not well be ranged under any other species. After all, it seems that they are *rosacea*.

¹ As directly evident from some of his descriptions and notes. *E. g.*, he says in the description of *C. securis*: "shell shining," which is rather an exception than the rule. Some of his descriptions were made from single specimens, as he states.

10. *C. securis* Pr. Widely distributed, common, and quite variable in size, shape, surface sculpture and color. The shell is more or less inflated; the beaks are more or less prominent, broader or narrower, often not calyculate, but simply rounded; the posterior end is more or less truncate, the disproportion between the anterior and posterior parts various; the surface of the shell is usually dull or even rough from fine scales of the epiconchi, but sometimes smooth or even glassy. The color varies from brown to a vivid yellow or orange (*crocea* Lewis).

11. *C. sphærica* Anth. I have seen no authentic specimens and no Calyculinæ from the original place, and consequently am unable to judge about it. It appears to be very near *securis*, also from some Michigan specimens received as *sphærica*.

12. *C. rykolti* Normand. From Traverse City and from Straits Lake, Michigan, Mr. Bryant Walker has sent specimens of a Calyculina, which so closely resemble *C. rykolti* from Germany and Sweden that they can hardly be regarded as distinct. More materials may bring additional evidence.

Larger specimens (of the size given as typical by Clessin) from Saguache, Colorado, were in the collection of the late Dr. James Lewis, now in possession of Mr. Bryant Walker. The agree with *C. rykolti*, but must also be compared with the following:

13. *C. raymondi* Cooper. The specimens I have from Washington (Spokane, Mrs. Olney, and Seattle, Mr. Randolph), are evidently not mature. They have much resemblance with *C. rykolti*, and it would be of special interest to know whether such forms also inhabit eastern Asia.

14. *C. deformis* Carpenter. My specimens are from Rhode Island and New Jersey, not authentic but probably true. Whether this Calyculina is a good species, or a form of *securis*, as has been asserted, I am unable to decide, for the present. At any rate, it is a remarkable form, seems to be distinct.

15. *C. lacustris* Mull. (?). To Mrs. M. Olney I am indebted for a few specimens from the Spokane river, Washington, which can in no way be distinguished from *C. lacustris*, from several European countries. They appear absolutely identical. More specimens from other places would be very welcome.

Of *C. subtransversa* Pr., *lenticula* Gld., and *tenue* Pr., I have no materials. Under the first name, *C. transversa* from Texas have been sent out.

A NEW RISSOA FROM CALIFORNIA

BY W. H. DALL AND PAUL BARTSCH.

Rissoa kelseyi Dall and Bartsch.

Shell of medium size, elongate-conic, white, variously banded, or uniformly chocolate brown. Nuclear whorls mammillate, smooth. Post-nuclear whorls slightly rounded, ornamented axially by a few broad, depressed, almost obsolete ribs which are best seen near the summit of the whorls, and many irregular, more or less deeply impressed striations, which extended almost undiminished to the umbilical region. The spiral sculpture however is more conspicuous than the axial, and consists of deeply impressed lines which are more closely placed and less strongly developed near the summit of the whorls than at the periphery, grading gradually in this respect between these two regions. Sutures simple, well marked. Periphery and base of the last whorl well rounded, the latter ornamented by spiral sculpture similar to that between the sutures, but a little more distantly spaced and more strongly impressed. Eighteen of the spiral lines appear between the sutures upon the penult whorl and ten upon the base. Aperture large, oblique, decidedly effuse anteriorly; posterior angle acute, peristome continuous; columella strong, short, somewhat twisted and slightly revolute.

The type has seven post-nuclear whorls and measures: long. 6.3 mm., diam. 2.5 mm.

Seven specimens were sent to the National Museum by Mr. F. W. Kelsey, who collected them at Pacific Beach, California. The type and two specimens now form no. 168605 of the U. S. N. M. collection, the remaining four being in Mr. Kelsey's collection.

This species appears to be nearest related to *Rissoa abolirata* Carpenter, but is larger in every way than that form; there are also minor differences in sculpture.

VITREA DRAPARNALDI, BECK., IN WASHINGTON, D. C.

BY GEORGE W. H. SOELNER.

On the 22d of May, 1901, I visited a greenhouse in this city for the purpose of investigating its snail life, and was rewarded by finding a colony of what I at that time firmly believed to be finely de-

veloped specimens of *Vitrea cellaria*. A number of specimens were collected and labeled accordingly, and as many have since passed into the hands of friends, it may be well to state, in the interest of those who may not be familiar with the specific characters which differentiate this species from *V. draparnaldi*, that my identification of these shells was erroneous.

A recent search among the disintegrating ruins of an old mill in Georgetown, one of the oldest sections of the city, very unexpectedly brought to light specimens of a *Vitrea* which, notwithstanding its quite close resemblance to *draparnaldi*, is undoubtedly, I think, *cellaria*, although the shells obtained are unusually small and fragile, which is probably due to their out-of-door life. The largest measured only 8.75 mm. greater diameter. Owing to their smaller size and the different color of the animal and shell, I was at once impressed with the belief that I had found two species. A re-examination of specimens was, therefore, necessary, and after carefully comparing my first lot with Mr. Frank C. Baker's description and remarks on *V. draparnaldi*,¹ I was delighted to find that I had discovered this species; the specimens agreeing exceedingly well with his description in every detail. Dr. Pilsbry and Mr. Geo. H. Clapp, of Pittsburg, Pa., to whom I have sent examples, have kindly verified the identification.

Being anxious to know if the colony was flourishing, I again visited the nursery on November 3, 1902, and again secured a number of fine specimens, the largest measuring 16 mm. greater diameter.

This interesting find not only adds another species to the list of the mollusks of the District of Columbia, but another locality, and that a remote one, to the geographical distribution of this handsome introduced species, which seems to be gradually spreading over the United States. As far as I know, this is the first record for this shell east or southeast of Chicago, Illinois.

Washington, D. C., November 15, 1902.

NOTES AND NEWS.

NOTES ON LIMNÆA.—The receipt of Mr. F. C. Baker's very excellent work on the Mollusca of the Chicago Area suggests a few remarks on *Limnæa*. It seems unfortunate that American workers

¹ *Mollusca of the Chicago Area, Part II*; Chicago Academy of Sciences, April 25, 1902.

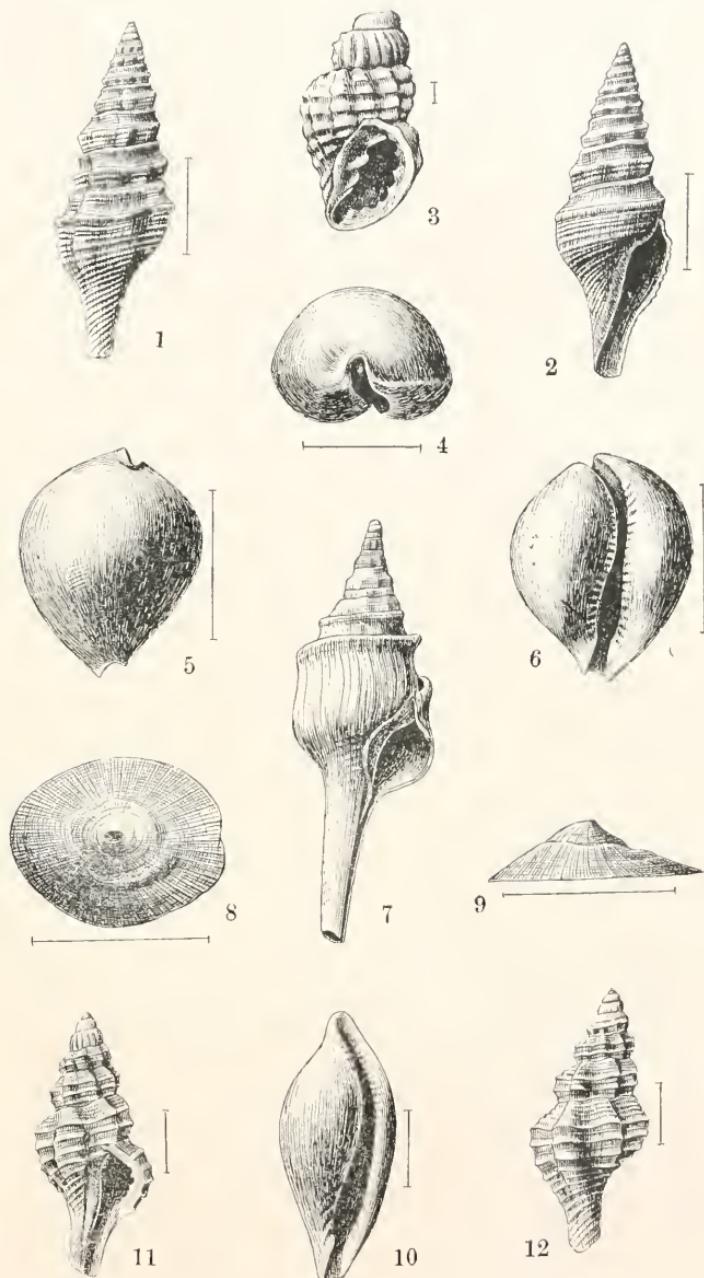
do not pay more attention to the European forms of the circumpolar types. Judging from the names, one would suppose that the American variations of *L. palustris*, etc., were quite different from those found in Europe. If this is the case, it is a fact of much interest; but it has never been demonstrated by comparisons, nor is it suggested by the figures in Mr. Baker's work. The variety *expansa* Hald., of *L. palustris*, is to be compared with the European var. *coniformis* Bourg., which on the face of things appears to be the same; while other American *palustris* seem referable to varieties *elongata* Moquin (Baker, Pl. xxxii, first three shells of fig. 1), and perhaps *conica* Jeffreys. In fact, it is not yet clear that there is any American variation of *L. palustris* which cannot be duplicated in Europe. With regard to *L. stagnalis*, it is well said that the typical European form is not that found in America, but it is apparently not true that the American form (*appressa* Say) is absent from Europe. I have seen plenty of European specimens which could not, I think, be distinguished from the American ones; such appear to pertain to the variety *fragilis* (Linné) and its allies. Some one should minutely examine the anatomy of these forms, to see whether it is not possible that there are two species, viz.: (1) *L. stagnalis* (L.), European; (2) *L. fragilis* (L.), Europe and America, including *appressa* Say, *raphidia* Bourg., *vulgaris* Westerlund, etc.

Liunæa Woodruffi Baker, appears from the figures to be the European *L. peregra*, in which case it must have been introduced.—
T. D. A. COCKERELL.

THE death is announced of the Jesuit Father Prof. P. HEUDE, on January 3d, at Zikavei, near Shanghai, at the age of 66 years.

At the NOVEMBER MEETING of the SECTION ON CONCHOLOGY, Brooklyn Institute of Arts and Sciences, Mr. S. C. Wheat exhibited two specimens of fresh-water mollusca taken from a stream in New Jersey, which, upon careful inspection by Dr. R. Ellsworth Call, were pronounced to be hybrids between *Margaritana marginata* and *Anodonta undulata*. The specimens aroused much interest, as such hybrids are very rare. A specimen of *Anodonta implicata* seven inches in length taken from Prospect Park Lake was also shown. These specimens were added to the collection in the Children's Museum.—F. H. AMES, Sec.

Description de mollusques nouveaux provenant de l'île Obi (Moluques). In *Le Naturaliste*, Nov., 1902, p. 247, Mr. Dantzenberg has described and figured a series of *Helices* and two *Leptopomas*. Of the former *H. (Albersia) omissa* seems to be identical with *H. (Albersia) obiensis* Mart. (Archiv f. Naturg. 1899, pl. 3). *H. (Papuina) obiensis* Dautz, is apparently *H. (P.) piliscus* Mts. *H. (Papuina) gouldi* is a fine, pyramidal, carinate species of the *pileolus* group, somewhat similar to *P. rynchostoma* Ptr.—H. A. P.





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ALDRICH: EOCENE MOLLUSCA.

THE NAUTILUS.

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No. 9.

NEW SPECIES OF TERTIARY FOSSILS FROM ALABAMA, MISSISSIPPI AND FLORIDA.

BY T. H. ALDRICH.

The following species are principally Eocene; descriptions of two species have already appeared in *THE NAUTILUS* and they are now figured for the first time. One new species from the Oligocene of Oak Grove, Fla., has been added. The Oligocene deposit of Oak Grove has been pierced by a deep well near Mobile, Ala., and no doubt it will be found still further to the westward. I am indebted to C. W. Johnson, of the Wagner Free Institute of Science, for comparisons with types in the Academy of Natural Sciences, Philadelphia. All the drawings have been executed by Dr. J. C. McConnel, of the Army Medical Museum, Washington, D. C.

PLEUROTONA (DRILLIA) CASEYI n. sp. Pl. III, fig. 1, 2.

Shell fusiform, whorls ten to eleven, first four smooth, apex pointed, the balance of the whorls nodular with a connecting line situated at the periphery. About nine nodes on each whorl. The balance of the spiral sculpture consisting of close-set, rounded lines, which are stronger on the lower part of each whorl; suture nearly concealed by a strongly raised and rounded band which is wavy and closely appressed. On the humeral area the spiral lines are cut by fine curved lines formed by the former retral sinus, sinus nearly semi-circular. Canal open and slightly spatulate.

Length 11 mm., width 3 mm.

Localities: Red Bluff, Miss., Byrums Ferry, Pearl Ry., Miss., and Vicksburg, Miss.

Resembles *Drillia texanopsis* Harris, but is carinated at the periph-

ery, more strongly striated and with a deeper retral sinus. Maj. Thos. L. Casey, U. S. Engineers, has sent me examples from the upper part of the bluff at Vicksburg. The shell is named in his honor.

CANCELLARIA ANNOSA Aldr. Pl. III, fig. 3.

This species was described in THE NAUTILUS, Vol. XI, p. 97, January, 1898.

CYPRÆA NUCULOIDES n. sp. Pl. III, figs. 4, 5 and 6.

Shell broadly ovate, rounded, globose, extremities slightly produced, surface smooth, basal callus heavy and extending upwards about one-third on each side, base flattened, rounded into the aperture, resembling in this respect *C. pinguis* Con., but broader. Aperture rather narrow, denticulated.

Length 17 mm., greatest breadth 14 mm.

Localities: From the Claibornian at De Soto, Miss., McLeod's Mill, Miss., and Dubose's Mill, in West Alabama.

This species has a more flattened base than *C. spheroides* Con. and has a much heavier basal callus. The inner lip is smooth below the denticulations.

CLAVILITHES COLUMBARIS n. sp. Pl. III, fig. 7.

Shell fusiform, whorls ten, apex bulbiform, consisting of three whorls, the third constricted; the next four spirally striated and tuberculated, the last two strongly turreted and excavated below the sutural shoulder. Aperture small, constricted at posterior. Canal long, narrow.

Length of figured specimen 52 mm.

Localities: Claibornian of De Soto and McLeod's Mill, Miss., also in West Alabama, same horizon. This species approaches the form described by Harris as *Clavilithes humerosus* Con., var. *texanus*, but the size and extremely prominent shouldered whorls and the constriction below are peculiar. The figured example is the most perfect one obtained, but the shoulder is even more prominent in other specimens. On comparing this species with *C. longævus* Lamarck, I find it has one less embryonic whorl and a higher spire.

FISSURIDEA INFREQUENS, n. sp. Pl. III, figs. 8, 9.

Shell medium size, with broadly ovate periphery at base, rather depressed; substance of shell thin, foramen in anterior half, small and narrowly ovate.

Greatest breadth at base 22 mm., height 6 mm.

Locality : On the Chickasawhay River, three and one-half miles below Quitman, Miss., below the *O. sellæformis* bed, Claibornian.

This species differs from any Tertiary species known by the very thin shell in comparison with its size, and its very fine cancellation. The interior is filled with matrix.

OVULA SYMMETRICA n. sp. Pl. III, fig. 10.

Shell smooth exteriorly, spire produced, pointed and slightly spatulate, outer lip reflected, margined on the interior with numerous crenulations, and curved from spire to base. Aperture narrow, the inner margin of same denticulated near the spire and with three or four folds at base.

Length of figured example 9 mm.

Localities : McLeod's Mill and on the banks of the Chickasawhay River, three and a half miles below Quitman, Miss.; close to the Wautubbee beds of the Claibornian. This species differs from both *O. subtruncata* and *O. texana* of Johnson, and it has been kindly compared with the types by C. W. Johnson.

The specimen from the bluff below Quitman is broken, but if perfect would be about 13 mm. in length.

LATIRUS ELABORATUS n. sp. Pl. III, figs. 11, 12.

Shell small, whorls nine, the first three smooth, the fourth partly so, the balance nodular and crossed by spiral lines, the lines faint on the upper part of each whorl, becoming coarser below and developing plaits at the top of the transverse nodes; the younger whorls have two coarse spiral lines about their centre.

Suture irregular, closely appressed. Outer lip nodular within, the pillar lip smooth with the exception of two slight raised plaits about the centre of the aperture within; canal produced and but slightly curved.

Length of the largest specimen 11 mm., breadth $4\frac{1}{2}$ mm.

Localities : Matthew's Landing bed, at C. Jones, Wilcox Co., Ala., and in the Black Bluff clays near Grave Yard hill, Ala. The figures are of a small specimen and do not show the two plaits on the pillar lip because they are too far within the aperture.

ANOMIA NAVICELLOIDES Aldr. Pl. IV, figs. 13, 14.

For description see THE NAUTILUS, Vol. XI, p. 97, January, 1898.

CHAMA MONROENSIS n. sp. Pl. IV, fig. 15.

Shell of medium size, strongly rugosely plicated, lamellar. Upper valve with 6-8 leaves turned up to nearly a vertical at their ventral edges, each leaf covered with radial raised lines running in couples. Upper valve slightly convex, lower valve convex and inequilateral.

Resembles somewhat *C. corticosa* Con., but is smaller and more profusely ornamented. One lower valve has twelve leaves or corrugations. The upper valve is shown in the figure natural size.

Locality: The *O. sellæformis* bed, at White's Marl bed, Monroe Co., Alabama.

PECTEN (PSEUDAMUSIUM) SUBMINUTUS n. sp. Pl. IV, figs. 16, 17.

Shell minute, thin, surface smooth, not polished, valves rather flat, ears small, subequal in the right valve and unequal in the left. Fine rugose striae on the ears of the right valve, vertical to the hinge line, but not reaching it, but they run down over the submargin. One ear in the left valve with five or six radiating ribs, the other smooth; interior smooth, the cardinal margin cross striated.

Alt. 3 mm., lat. 3 mm. of the largest specimen.

Localities: Red Bluff, Miss., Jackson, Miss.

This little shell is evidently adult. It is probably found at Vicksburg also. It is not rare, closely resembles *Pecten Guppyi* Dall in form, but is smaller.

VERTICORDIA DALLIANA n. sp. Pl. IV, fig. 18.

Shell small, rather flat, surface ornamented with sharp curved ribs, in the present specimen thirteen in number, nine on the anterior, then a concave space as if one rib was missing, then two more ribs about the middle of the shell, then a wide concave space and then two more ribs, the last one almost at the margin. Ribs serrating the ventral margin. Cardinal tooth strong, erect; lateral tooth long and curved.

Breadth $2\frac{1}{2}$ mm., height from beak to base 2 mm.

Only one valve found; it is about the same size as *V. eocene* Langdon. The muscular scars are slightly impressed. Pallial line not perceptible.

VERTICORDIA SOTOENSIS n. sp. Pl. IV, figs. 19-21.

Shell small; strongly ribbed with twelve ribs, then a blank space, then two ribs near the margin, beaks blunt and rounded, ventral

margin serrated; lateral tooth long and curved. Interior very porcellaneous; muscular scars slightly impressed.

Localities: Claibornian of De Soto and McLeod's Mill, Miss., and also in West Alabama, same horizon.

This species closely resembles *V. dalliana* Nobis, but differs in the number of ribs and the absence of one space which appears on the other. It is also more rounded.

VERTICORDIA QUADRANGULARIS n. sp. Pl. IV, figs. 22, 23.

Shell stout, valves nearly quadrangular, rather thick and globose. Surface with numerous coarse, rounded ribs. Entirely covered with granulations; deeply excavated behind the beaks; possesses both cardinal and lateral teeth. Muscular scars are deeply impressed. Pallial line strongly marked. Internal basal margin showing the ribs.

Height and breadth equal, 7 mm.

Several valves were found. This species belongs to the Section *Haliris* Dall. The laterals are more strongly developed than in most forms of this section. It is distinct from *V. mississippiensis* Dall in having fewer and more rounded ribs and a more depressed lunular area.

CANCELLARIA BIFOLIATA n. sp. Pl. IV, fig. 24.

Shell small, whorls six, first two smooth, the third partially so, and the last three strongly cancellated. The ribs prominent, spiral lines alternately coarse and fine. Umbilicus open, pillar lip with two plaits. Shell appears to be turreted from the strong ribbing.

Length 7 mm., breadth 4 mm.

Locality: Oak Grove, Florida, Oligocene of Dall.

This little species differs from *C. mississippiensis* Con. in its less number of plaits on the pillar, its higher spire and open umbilicus.

A NEW CRASSATELLITES FROM BRAZIL.

BY WM. H. DALL.

Among some dead shells dredged by the U. S. Fish Commission in fifty-nine fathoms mud, east of Rio Janeiro, Brazil, were a number of valves which were inadvertently put away among a lot of Astartes. On overhauling the latter, lately, these valves were found

and re-examined, proving to be an undescribed species of *Crassatellites* from a region where none had been reported hitherto.

CRASSATELLITES BRASILIENSIS n. sp.

Shell solid, small for the genus, yellowish-white, covered with a thin brownish periostracum; valves ovate, slightly squarish behind, rapidly descending and rounded in front, with pointed, slightly flattened beaks, sculptured with a few (5 to 10) low concentric waves beyond which the disk is smooth, or concentrically striated with some very obscure, fine, radial lines near the anterior base; lunule narrow, elongate, bounded by an obscure sulus inside of which the area is excavated; escutcheon similar but much larger; basal margin minutely crenulate within, hinge normal, the resilium immersed but rather short and wide; muscular impressions well defined. Height 27.5: length 36; diameter 15 mm., some specimens being proportionately a little shorter.

The posterior end is obscurely truncate, but in some specimens slightly rostrate. On the whole, the species has much the aspect externally of a smoothish *Astarte*. The bottom temperature where dredged was 57° Fahr. The beaks are usually a little behind the anterior third of the valves.

SHELL COLLECTING ON THE MISSISSIPPI.

BY FRANK C. BAKER.

For a number of years it has been the custom of the Chicago Academy of Sciences to have a Field-day some time during the month of July and to spend the day investigating some notable or particularly interesting locality, from a zoölogical, botanical or geological standpoint. These excursions are not only attended by members of the Academy, but by the faculties and students of the Chicago University, the Northwestern University and kindred scholastic bodies.

Saturday, July 12th, was chosen as the field-day for 1902, which dawned bright and pleasant. About one hundred and fifty people, including many of the charming "co-eds" from the Zoölogical Department of the Chicago University, met at the Chicago, Milwaukee and St. Paul depot, from which the special train left at eight o'clock

for Savanna, Illinois, our objective point. The ride consumed several hours and we arrived in sight of the Mississippi about noon.

Our first thought was for the "inner man," and we hastened in a body to the river bank, where we bargained with the boat renters and secured row-boats. No sooner were our bargains completed than we scrambled into our boats and rowed across the river toward a group of islands, where we ate our lunches.

The pull across the river was very interesting, especially to several of the "co-eds," who bravely volunteered to row one or two of the boats, for there was a seven-mile current which made this a matter of great exertion. The writer had never before seen the "Father of Waters," and he must confess that a peculiar feeling came over him as he rowed across the swiftly-flowing stream and thought of the many historic scenes which had taken place on or near this mighty river since De Soto first saw it. But the most interesting fact *to him* in connection with this river was that it afforded a home for more Unios than any other stream in the world.

As soon as lunch was out of the way we began a hunt for clams, and before the time arrived for the departure of our train we had accumulated several bushels, beside numerous examples of fresh-water gastropods, such as *Campeloma* and *Vivipara*.

About a mile above Savanna we found several men engaged in "fishing" for clams, which they sold to the button-factories at Muscatine and other places in Iowa and Illinois. Their method of fishing was ingenious. A bar of iron (frequently a gas pipe) six or seven feet long is strung with four-pronged hooks, made of bent and twisted telegraph wire. The strings are about five inches apart and two or three hooks are attached to each string, making two or three rows of hooks attached to the bar. As many as forty hooks are frequently strung on one bar, the whole appliance being locally known as a "crowfoot" dredge or grapple. A piece of rope is tied near each end of the bar, forming a sort of bridle, and to this is fastened another rope, twenty-five or more feet in length, by which the dredge is pulled over the bottom of the river.

At first sight one would hardly suppose that with such an instrument a person would be able to gather very many clams, but the fishermen told us that several tons could be obtained with this apparatus in a comparatively short time. The clams are caught in this way: in many parts of the river the Unios lie packed by thousands,

their shells half protruding from the mud and slightly gaping, as is natural with all these mollusks when at rest. As the fisherman pulls the dredge along the bottom over these *Unio* beds the prongs of the hooks become caught between the open valves of the shell, which immediately close and fasten themselves to the prong. A single haul may yield over one hundred shells caught in this way.

The inordinate collecting of shells for the button industry bids fair to exhaust the supply before many years have passed unless wise laws are enacted and enforced. Not only are many tons of these shells taken every year, but a large number are wilfully wasted by the fishermen. An example of this waste came under the notice of the writer on this occasion. Having failed to secure as many specimens as were wanted, a fisherman was asked if he knew a good place to gather clams. He replied that just above a large grain elevator some fishermen had dumped a boat-load on the shore. Not realizing fully what he meant, we walked to the spot indicated and there beheld a sight which made at least one of the party both glad and sad. Piled on the shore for a distance of a quarter of a mile were thousands upon thousands of clams, some alive, others with gaping shells and a few entirely devoid of the animal. Not less than twenty-five species were represented, many of them useless for the manufacture of buttons, but of great value to the conchologist of the future who may wish to study these species. The fishermen were either too lazy to throw them back into the water or else thought that if they threw them on the shore they would avoid catching them again on their hooks. Such wanton destruction as this, if not stopped, will soon exterminate many of the species. Those which were thus destroyed were comparatively thin shelled, such as *Anodonta*, *Alasmidonta* and *Symplynota*.

The species collected by the different parties were as follows :

<i>Lampsilis ventricosa</i> Barnes.	<i>Plagiola securis</i> Lea.
<i>ligamentina</i> Lamarck.	<i>elegans</i> Lea.
<i>anodontoides</i> Lea.	<i>Obliquaria reflexa</i> Rafinesque.
<i>fallaciosa</i> (Smith) Simpson.	<i>Strophitus edentulus</i> Say.
<i>recta</i> Lamarck.	<i>Anodonta corculenta</i> Cooper.
<i>parva</i> Barnes.	<i>Arcidens confragosus</i> Say.
<i>alata</i> Say. ¹	<i>Symplynota costata</i> Rafinesque.
<i>gracilis</i> Barnes.	<i>complanata</i> Barnes.
<i>leptodon</i> Rafinesque.	<i>Unio gibbosus</i> Barnes.

¹ One specimen of *alata* was curiously deformed, one valve being perfectly flat while the other was very convex.

Unio crassidens Lamarck.	obliqua Lamarck.
Pleurobema æsopus Green.	ebena Lea. ¹
Quadrula plicata Say.	tuberculata Rafinesque.
undulata Barnes.	metanevra Rafinesque.
heros Say.	Vivipara intertexta Say.
lachrymosa Lea.	Campeloma integrum DeKay.
pustulosa Lea.	subsolidum Anthony.
pustulata Lea.	Polygyra multilineata Say.
trigona Lea.	

The last was found to be a common inhabitant of the islands in the river and in the woods bordering the Iowa side of the river.

At Carroll Creek, ten miles from Savanna, Mr. C. C. Adams, of the University of Chicago, collected the following species, all being very common :

Amnicola limosa Say.	Physa integra Haldeman.
Physa gyrina Say.	Succinea ovalis Say.

A NEW FOSSIL ASHMUNELLA.

BY T. D. A. COCKERELL.

ASHMUNELLA THOMPSONIANA PECOSENSIS subsp. nov.

Small (diam. max. 12, min. 10.5 mm.); last half of last whorl very distinctly transversely ribbed, recalling *A. altissima*; lip and teeth strongly developed, basal tooth single.

Hab. : Vallé Ranch, Pecos, New Mexico, in a light reddish deposit of uncertain age, Nov. 30, 1902. (T. D. A. and W. P. Cockerell.) The commonest shell in the deposit is *Pyramidula strigosa cooperi*. *Vallonia cyclophorella* is also abundant.

Last year my wife collected a dead shell of a recent *Ashmunnella* at the old Pecos Pueblo, which is only a few miles from the Vallé Ranch. It is *A. thomsoniana*, with max. diam. 13.5 mm., basal tooth single. There is no sign of the ribbing of the fossil form.

¹ This species is called "nigger-head" by the fishermen, and is considered the most desirable shell for the cutting of pearl buttons.

NOTES ON SOME SHELLS FROM NORTH CAROLINA.

BY E. G. VANATTA.

OMPHALINA RUGELI OXYCOCCUS n. var.

This variety is distinguished from the typical *O. rugeli* Binn. by being densely microscopically granulate above and having the base nearly smooth.

The type is in the collection of the Academy of Natural Sciences of Philadelphia, No. 68743, collected by Mr. H. W. Wenzel, June, 1896, at Cranberry, N. C.

Locality: Cranberry, N. C., collected by Mr. H. W. Wenzel, Dr. Henry Skinner and Mrs. Geo. Andrews; also at Banners Elk, Watauga Co., N. C., by Mrs. Geo. Andrews.

The following species were collected by Mr. Joseph Willcox during July, 1902.

At Blowing Rock, Watauga Co., N. C., the following were taken: *Goniobasis proxima* Say (3500 feet elevation). *Polygyra andrewsæ normalis* Pils. *Circinaria concava* Say.

Polygyra albolabris Say. *Philomycus carolinensis* Bosc.

And at Cranberry, Mitchell Co., N. C., the following species:

<i>Polygyra andrewsæ normalis</i> Pils.	<i>Polygyra tridentata</i> Say.
<i>monodon fraterna</i> Say.	<i>Vitrinizonites latissimus</i> Lewis.
<i>stenotrema</i> Fér.	<i>Circinaria concava</i> Say.
<i>thyroides</i> Say.	<i>Pyramidula perspectiva</i> Say.
<i>subpalliatia</i> Pils.	

NOTES.

HAWAIIAN PHYSIDÆ.—It has been held by Pease and others that the reversed fresh-water shells resembling *Physa*, found in the Hawaiian Islands, are all Limnæids belonging to *Ameria* or some related group. Part of them certainly are, but a species, believed to be *Physa compacta* Pease, received from Mr. H. W. Henshaw, of Hilo, Hawaii, proves, on anatomical examination, to be a *Physa*, though whether referable to *Physa* s.s. or to *Aplexa* cannot be determined, owing to the contraction of the mantle edge which, in spirits, appears not to be digitate.—W. H. DALL.

“PYRAMIDULA” STRIGOSA CONCENTRATA.—I have lately re-

ceived a couple of specimens of this form (max. diam. barely over 12 mm.), collected by Mr. C. S. Onderdonk, at Alpine, Chaffee county, Colorado, at between 10,000 and 12,000 ft. This is a long way from the original locality, but I sent one to Dr. Dall, who certified that it is the genuine *concentrata*. There are two dark bands, both narrow but strongly developed. This var. *concentrata* is extremely close to my var. *minor* (max. diam. 14 mm.), described in *Journ. of Conchology*, 1890, p. 175. The latter, however, is not alpine.

No doubt the Colorado *concentrata* have evolved independently from the New Mexico and Arizona ones, and, therefore, might perhaps be considered entitled to a different name.—T. D. A. COCKERELL.

ERRATUM.

NAUTILUS, p. 96, line 8 from top: For *coniformis* read *corviformis*.—T. D. A. COCKERELL.

PUBLICATIONS RECEIVED.

THE MOLLUSCA OF THE MT. MITCHELL REGION, NORTH CAROLINA.—By Bryant Walker and H. A. Pilsbry. Proc. Acad. Nat. Sci., Phila., 1902, pp. 413-442, Pls. xxiv, xxv.—In vol. xiv, p. 45, we noticed Professor Pilsbry's account of the Mollusca of the Great Smoky Mountains. The present paper sets forth the results of the exploration of the French Broad river region by Messrs. Ferriss and Walker "and two ladies" in 1901. The Roan Mountain fauna being pretty well known from the investigations of Wetherby, Walker and others, it now becomes possible to determine with some degree of accuracy the range of the different species in this part of North Carolina and adjacent Tennessee. It had previously been made clear that the Roan Mountains and Great Smoky regions, though only about seventy-five miles apart, possessed molluscan faunæ which were by no means identical; the expedition of 1901 sought to determine whether the valley of the French Broad river might be the dividing line between the Roan and Great Smoky faunæ, and whether Mt. Mitchell, with an altitude of 6,711 ft., might not produce something peculiar to itself. With the results of the expedition before them, the authors conclude that the French Broad river is not the dividing line between the two faunæ just mentioned, and, in fact,

that there is probably no sharp line of demarcation anywhere. It is found, however, that the French Broad river region has itself some of the characteristics of a distinct faunula, although Mt. Mitchell, the centre of the explorer's hopes, proved disappointing. A comparative list, showing the distribution of the species, is presented on pp. 420, 421. To the Roan Mountains list should be added *Philomyicus secretus*, described from thence, and *Vitrea carolinensis wetherbyi*,¹ sent to the present writer from Roan Mountain by Wetherby. The true *V. carolinensis* probably does not occur at Roan Mountain, as I gathered from Wetherby's letter when sending the *wetherbyi*, that he knew only the latter.

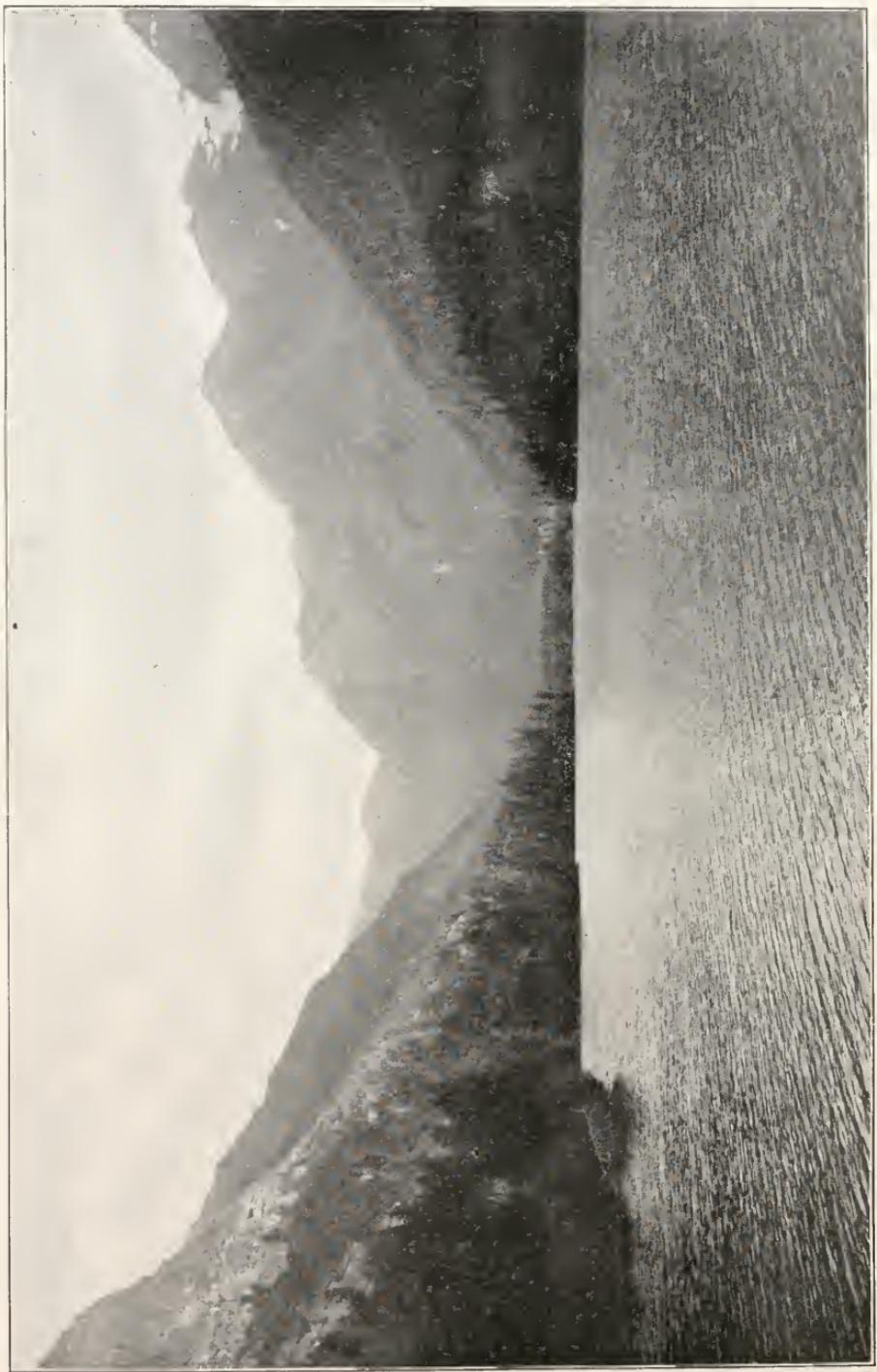
Leaving out a few probably erroneous records, we find 105 species and races of land mollusca recorded from the whole region discussed. Of these, only 33 are recorded as common to all three faunulæ, *i. e.*, the Roan, French Broad and Great Smoky. Three are common to the Roan and Great Smoky regions, and have very likely been overlooked in the French Broad. 25 are from the Roan alone, 10 from the Roan and French Broad, 8 from the French Broad alone, 7 from the French Broad and Great Smoky and 19 from the Great Smoky alone.

The same peculiar features of the fauna as were observed in the Great Smokies are seen in the Mt. Mitchell region. The Pupidæ are represented by a single example of *Strobilops*, and this a southern form. Not a single Limnæid was found anywhere; not even *Physa*.

The new forms described in the paper are: *Polygyra tridentata tennesseensis* W. & P., *P. andrewsæ intermedia* W. & P., *Vitrea approxima* W. & P., *V. vanattai* P. & W., *Gastrodonta gularis theloides* A. D. Brown MS., and *G. gularis decussata* Pils. & Van.; while *Polygyra hirsuta* vars. *altispira* and *pilula* are raised to specific rank. *Pyramidula alternata mordax* was rediscovered by the expedition, and is fully discussed and figured.

Altogether, the paper is certainly a most satisfactory one, and we can only hope that it will be followed by a long series of similar ones. It will be some time before Messrs. Pilsbry, Walker, Ferriss and their friends exhaust the possibilities of the Appalachian Mountains, which seem to contain an extraordinarily varied and interesting mol-luscan fauna.—T. D. A. COCKERELL.

¹ On page 430, the date of publication of *wetherbyi* is said to be 1901. It should be 1900.



MCDONALD LAKE, MISSION MTS., MONTANA.

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NOTES ON PYRAMIDULA ELRODI PILS.

BY MORTON J. ELROD.

This shell was first collected on the sides of the Mission Mountains, above Post Lake, in the summer of 1899. About forty were taken, all dead. Specimens were sent to Dr. Pilsbry, of the Philadelphia Academy of Sciences, who described the species in *NAUTILUS*, Vol. XIV, 40, naming the shell after the collector.

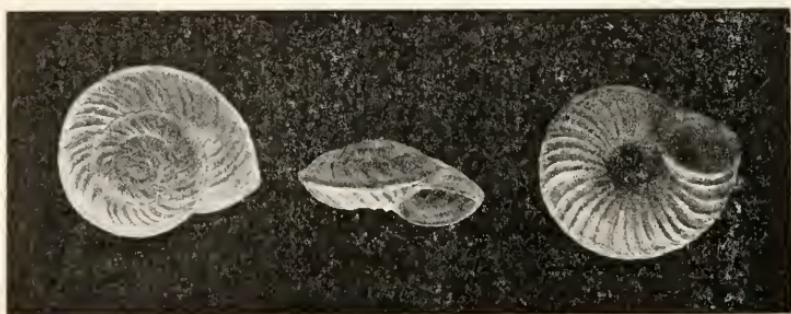
During the collecting expedition of the University of Montana Biological Station, in July, 1900, a stay of ten days was made at McDonald Lake for the express purpose of making further investigations of this species. During this time some three quarts of specimens were collected, of all sizes and varying colors, from the dark brown of the living shells to the bleached white of the dead ones. Also some three dozen living snails were secured, which were drowned, and in a number of cases, beautifully expanded.

The distribution of the species, so far as known, appears to be quite local, and is deserving of further study. At present it seems confined to the mountain slopes forming the amphitheatre around and to the east of Post Lake. On the south side of the lake, owing to the dryness of the rocks and soil, it appears very scarce, one living and several dead shells being the result of an afternoon's search. A search on the north bank during the same time on the same day resulted in a quart of shells, a dozen living. While no search has been made in the mountain slopes east of the lake, there can be little doubt of its presence, since the shell is found on both sides of the lake.

On the north slope of the lake four small streams tumble over the

rocky wall of the mountains, making beautiful little cascades. The first of these, beginning next the plain, appears to come out of the rocks high up, flows through a small canon between the cliffs, and shortly afterward disappears in the loose talus below. Earlier in the year these loose, talus rocks are wet with melted snow, but at the time of collecting, in July, they were hot and dry.

On the talus below the first fall, shells were found abundantly. On the talus of the ravine, a few feet to the west, only a few were found, while still further west none whatever could be found anywhere. This little stream from the mountain, therefore, seems to mark its distribution on the mountain towards the west. Acting on this basis, the rocks were followed upward along the sides of the



mountain, following the little gully of the stream mentioned. Shells were found as high as we went, a distance of 1,500 feet, or up to a total elevation of 5,000 feet above the sea. Time did not permit a search higher.

The limit of distribution of the shells, as mentioned, ends abruptly. A search eastward from the mountain stream caused the discovery of shells in abundance for a mile; beyond this we did not go. There is a great deal of difficult mountain climbing necessary to explore these regions, and a half day does not permit one to go far. But from the fact that they have been found on the slopes of Mt. McDonald, across the lake to the south, it would appear evident that the unexplored canons and mountain sides forming the large amphitheater supplying the lake's waters, support the *Pyramidulas*.

The writer has been in different places in the Mission range, from one end to the other, on the western slopes, and nowhere else have

the shells been found. Whether or not they are on the eastern slopes, on the Swan river side, is yet to be determined.

The habits of the shells are very peculiar. Shells are rarely found among the bushes or where there is much vegetation. They are found on the surface among the loose rocks of medium size, but not among the large boulders or the finer talus. When bleached, they are a beautiful white, their color against the dark brown or lichen-colored sandstone making them very conspicuous objects. The corrugations show plainly from a distance, and there is no difficulty whatever in seeing the dead shells when in the region where they are to be found.

The living ones are not so easily discovered. They are dark brown, almost identical in color with the rocks among which they live, and very easily overlooked. When the animal dies the color changes to a delicate pink, and later the shell becomes a beautiful clear and pearly-white.

A search was begun for living shells by following up the talus where the shells were found most abundantly. After descending over a thousand feet, we came to a small ledge of rock forming a sharp promontory with a cliff below, on which we stopped to take a photograph of McDonald Peak, which showed up beautifully from this point. This ledge forms the western wall for the small canon through which the aforementioned stream comes. The loose rocks on the top of the cliff were overturned. It was with much surprise that shells were picked up, and among them one apparently alive. Diligent search revealed the fact that this small ledge, not more than thirty feet in extent, was the home of a colony of these interesting creatures. A quart of shells was secured, among them a dozen live ones, the first ever found. This ledge is shown on the left of the picture.

This home of the shell is very interesting and romantic. Living on the cliffs of one of the most rugged ranges in the State, with scant vegetation, it has a life common to few shells. It prefers the crannies among the loose rocks, hiding there from enemies.

After finding this first colony, a second trip was made over the same route, only farther up the mountain. Other colonies were found, with occasionally a live one. Search was then made lower down, among the rocks near the lake, resulting in finding live ones at different places, though to do so required considerable digging in

the rocks, in order to get down below the hot, dry rocks to where there was a little moisture.

It seems apparent that the living shells live among the loose stones, in the early spring crawling around over the damp rocks. As the warm spring and summer days approach, the rocks become dry. The snails previously crawling over them cease activity, and instead of all of them crawling for protection under the loose rock, some throw their protective film across the opening of the shell while yet on the rocks; the sun kills the animal, which dies, leaving the dead shell to bleach and become a conspicuous feature on the rocks. Here the shells remain, very few of them washing any distance.

All of the living shells taken appeared dead except a few. Invariably, however, when a shell sank in water the snail within was alive. It is probable that the species is continued by the hibernation of some of the more fortunate individuals which are deeper in the rocks, where there is more moisture.

ADAPTATION OF MOLLUSKS TO CHANGED CONDITIONS.

BY A. C. BILLUPS, LAWRENCEBURG, INDIANA.

Many years ago the Ohio river at and below Cincinnati, Ohio, was one of the most prolific hunting grounds of the collector of the fresh-water species of mollusks. At that time abounded in immense numbers (as is shown by the large quantities of duplicates in the collections of all the old collectors) *Anculosa praerosa* Say. About twelve years ago this shell disappeared almost entirely and for many years not a single specimen was found; this year, however, a few adults and large numbers of young shells have been found in localities where it is certain that no shells have existed for many years. The explanation of this occurrence is as follows; *A. praerosa* Say was a long time ago one of the most common of the river snails; the growth of the city of Cincinnati and the numerous factories along the banks of the river, each and every one adding to the filth of the water, pouring in sewage and acids, have rendered the water so foul that the *Anculosa* of the old day have been exterminated, all but a few of the most hardy of the species, which probably crawled to the lowest and most inaccessible parts of the river, where they managed to exist and to produce young: the young shells have become more used to the changed conditions, which worked such havoc with their ancestors,

and their descendants are so little affected by the foul water that they are now thoroughly acclimated and are producing young in large numbers used to the surrounding conditions. As this is the case, we may now look for *Anculosa praerosa* Say in nearly all its old haunts, where it will thrive under conditions which would have proved fatal to its ancestors. Many of our forest snails have been forced, by the clearing of the timber and tilling of the soil, to more or less adapt themselves to conditions not slightly, but very materially changed from those to which they were originally used. One of the most ready to take to the new mode of life was perhaps *Pyramidula alternata* Say, which is now one of the most sociable snails that exists in North America; this snail can be found in all our cities and doing well surrounded by conditions which are, without the slightest doubt, entirely strange to its nature—the rubbish heaps in every back yard harboring hundreds of fine and well-developed specimens in every stage of growth. Another forest snail which has taken kindly to open country life is *Polygyra appressa* Say. By setting a trap (a board greased with lard, placed about one inch above the ground) in a dark and damp alley between two houses in a low part of the town, I captured in ten nights the following number of snails: 9, 12, 10, 13, 26, 23, 18, 21, 12, 11—in all 155 adult specimens; young and immature specimens were not counted. This trap cleaned up all the snails in the immediate vicinity, as after that date the captures began to drop off and at the end of three weeks no more were taken. *P. monodon* Rack. and *inflecta* Say have in a smaller degree taken to open country life and are now common on nearly every railroad cut or fill under old cross-ties, but in nearly every instance deprived of the shade of the trees which seemed to be so necessary to their original abode. With *Pol. albolutris* Say and *exoleta* Binn., however, the change from woodland to open country does not agree. I have for years tried the experiment of transporting these eminently forest snails to places which, while being favorable for their maintenance, were still very different from their native haunts, and the result has been with both species a signal failure, and of three thousand that I transported three years ago, a very few only have managed to survive. They laid many eggs but very few of them ever hatched, and at the present time I doubt if there are twenty living snails to be found. *Pol. thyroides* Say is perhaps of the larger snails the most hardy, and the least affected by changed conditions. Mr Geo. H.

Clapp, of Pittsburg, Pa., informs me that *Vallonia* has adapted itself to open life and can now be collected in immense numbers in places very different from its original haunts. The question of the adaptation of mollusks to changed conditions is one of great interest, and in no country can the subject be so well studied as in America, where man and man's inventions change the whole face of an immense tract of country in a very short time. We know that the object of molluscan life (and in fact all life) is to preserve its own existence and to reproduce its own species. With rapidly-changing conditions, the snail must either adapt itself to these conditions or cease to exist, and it will be most interesting for many years to come to watch the struggle and to record the cases of success or failure. Complete local lists of species carefully made up, collections of large series of species from every possible locality and a knowledge of that locality and its conditions, will enable all students in this branch of molluscan evolution to arrive at a convincing and satisfactory conclusion. While in the older countries of Europe the forest snail has become now adapted to open country life, we have no records to bear upon the time when this change was taking place, and in all probability it was much more gradual than will be the case in this country of rapid and great changes.

NEW LAND SHELLS OF THE JAPANESE EMPIRE.

BY H. A. PILSBRY AND Y. HIRASE.

As already stated in a former number of the *NAUTILUS*, Mr. Nakada spent the autumn in exploration in the Hokuriku region, which includes provinces along the west coast of middle Hondo. The material examined shows that area to have but few endemic species, most of those collected being widely-distributed forms, already well known from other places. He reached Sado Island, where he found numerous species, the more interesting being a handsome new *Euhadra*, a sharply-carinate new *Helicina*, and specimens of *Blanfordia japonica* A. Adams. This last is perfectly distinct from the mainland form I called *B. jap.* var. *simplex*, which will now be raised to specific rank. *B. japonica* has a strong rounded ridge or varix behind the lip, such as is seen in many *Truncatellas*. Mr. Nakada returned to Kyoto, and started, November 5th, for Tosa province, in

Shikoku, with Mr. Adzama. We hope to have still more good things from this prolific province.

Mr. Hatai, who assisted Mr. Nakada in Ogasawara (Bonin Islands), continued to collect there after Mr. Nakada's return. On September 25th he started from Chichijima to go to Yuo-jima, small islands southward from the Ogasawara group. He reached Kita-Yuō-jima safely, but owing to stormy weather, a landing on Naka-Yuō-jima could not be made. The vessel stayed at sea, but the storm increased, and the ship was lost. After more than eighty days, no tidings of him have come. Mr. Hatai was faithful to the work, and his untimely loss through his efforts to increase our knowledge of these island faunas is deeply felt.

Eulota (Euhadra) sadoensis P. & H., n. sp.

Shell rather narrowly umbilicate, somewhat trochoidal, buff-whitish, with a sharply-defined dark chestnut band just above the periphery, a wider one, fading at the edges, on the upper surface, and a very broad band extending over most of the base, the interior of the umbilicus also dark; these bands leave the pale ground-color in narrow belts below the suture, above and below the periphery, and around the umbilicus. Surface glossy, irregularly obliquely striate, and showing the usual very fine spiral lines. Spire elevated, conic, the apex obtuse. Whorls $5\frac{1}{2}$, moderately convex, the last depressed but not angular, very slightly descending in front. Aperture very oblique, somewhat lunate; peristome expanded and reflexed, dilated half over the umbilicus, white, except where colored by the bands. Alt. 17, diam. 24 mm.

Sotokaifu-mura, Sado. Type no. 83909 A. N. S. P., from no. 994 of Mr. Hirase's collection.

This seems quite distinct from other members of the *peliomphala* group of *Helices*. The coloration reminds one of *Epiphragmophora mormonum* var. *cala*.

Eulota (Plectotropis) kiusiuensis var. *oshimana* n. var.

Similar to *E. kiusiuensis* in texture, sculpture, umbilicus and peripheral keel; but the spire is higher, and the color chestnut-brown instead of yellowish.

Oshima, Osumi. Types no. 83891 A. N. S. P., from no. 914 of Mr. Hirase's collection.

Ganesella notoensis Pils. & Hir., n. sp.

Shell imperforate, resembling *G. stearnsi* and *G. papilliformis* in general shape; pale greenish-buff, thin, dull with the luster of silk, but the early whorls are glossy, and there are some narrow, oblique, glossy streaks. Smooth to the eye, but under a lens showing slight growth-lines and almost obsolete spiral striation. Spire high, with slightly convex outlines. Whorls $6\frac{1}{2}$, moderately convex, the last slowly descending in front, convex beneath. Aperture very oblique, round-lunate, the peristome narrowly expanded, subreflexed; columella vertical, narrow, dilated over the umbilicus and appressed. Alt. 23, diam. 19 mm.

Kitanoshō, Noto. Type no. 83892 A. N. S. P., from no. 289 c of Mr. Hirase's collection.

This is a pale species, differing from *G. stearnsi* in color and the less convex whorls, which in *stearnsi* are swollen just below the suture. In *G. pagodula* and *G. papilliformis* the columella is different in shape.

Ganesella cardiostoma var. *kagaensis* Pils. & Hir., n. var.

Shell *imperforate*, somewhat globosely conic, light chestnut-colored, with an indistinct, pale, peripheral band; thin, somewhat transariant, smooth and glossy, slightly wrinkled by growth-lines, and very densely, minute striate spirally. Spire conic, with convex outlines. Whorls $5\frac{1}{2}$, convex, the last rounded peripherally, *very convex beneath*, especially at the last half; slightly descending in front, and contracted behind the lip. Aperture oblique, lunate-triangular, the lip thin, brownish, expanded, reflexed below, the steeply-sloping baso-columellar margin straightened, dilated over the umbilicus, where the base is deeply impressed. Alt. 13, diam. 14 mm.

Hakusan, Kaga. Type no. 84321 A. N. S. P., from no. 975 of Mr. Hirase's collection.

This form differs from *G. cardiostoma* Kob. (described from Kyoto, but not yet found there by Mr. Hirase), in the darker color (*cardiostoma* being yellowish-corneous, like *japonica*), and the very convex base, while *cardiostoma* is said to be flattened there.

Chloritis echizenensis Pils. & Hir., n. sp.

Shell shaped almost exactly like *C. bracteatus*, but glossy, the raised dots (not hairs) far less crowded, though still close; the apex

more obtuse, earlier $2\frac{1}{2}$ whorls coiled about in a plane. The sculpture is about as close as in *C. pumila*, but the processes are shorter, the shell larger, more elevated and glossy. *C. perpunctatus* is more depressed, smaller and narrowly umbilicate, while in *echizenensis* the perforation is almost closed by the reflection of the lip at its axial insertion. Alt. 13, diam. 19 mm., whorls $4\frac{1}{2}$.

Omiishi, Echizen. Type no. 84256 A. N. S. P., from no. 981 of Mr. Hirase's collection.

Related to the several species mentioned above, and best described by a comparison with them.

NOTE ON TRITONIA PALMERI COOPER, 1882.

BY T. D. A. COCKERELL.

The type locality of this species is San Diego, California, where it is said to be common. Cooper's description would hardly distinguish it from allied species, but as I know of only one species from southern California according with the description of *T. palmeri*, I assume that it is in fact the animal Cooper had in hand. The following notes, based on a specimen collected by Dr. W. R. Coe at Deadman's Island, San Pedro, California, July 18, 1901, may serve to facilitate the recognition of the species. The description is from life.

Length about 17 mm.; white, suffused with yellow dorsally; tentacles pale yellowish-brown; ends of lamellæ yellowish; dorsum rugose with small warts. Close to *T. lineata* A. & H., but differs by its strong yellow suffusion above and absence of opaque white dorsal lines. Ramose branchial lamellæ irregularly bipinnate, five on each side. Veil bilobed, each lobe produced into five or six finger-like filaments (two in *T. lineata*). Tentacles almost as in *T. lineata*; with the principal axis cylindrical and truncate, and numerous lateral branched processes, not so long as central axis. No eyes visible.

The species of *Tritonia* seem to be most easily distinguished by the character of the veil. *T. palmeri* has more processes on the veil than *T. lineata*, but very much fewer than in *T. holmbergii*, in which, however, they are very short.

SOME HOMONYMOUS GENERIC NAMES

BY T. D. A. COCKERELL.

In the course of some recent investigations, I found that certain names proposed by Mr. C. T. Simpson (Proc. U. S. Natl. Museum, 1900) for groups of Naiades were homonyms. I wrote to Mr. Simpson, asking him to propose substitutes, but he has preferred to leave this in my hands. The names are:

Dalliella Simpson, t. c., p. 832 (not *Dalliella* Cossmann, 1895). This may be called *Simpsonella*; type *Simpsonella purpurea* (*Anodontaea purpurea* Val.).

Aurora Simpson, t. c., p. 849 (not *Aurora* Rag., 1888, nor *Aurora* Sollas, 1888). This may be called *Diaurora*.

Anodontoides Simpson, is later than *Anodontodes* Hamps., but the difference of a letter is sufficient to prevent homonymy.

The name *Carinella* Mabille, pertaining to a tolerably distinct section of *Arion*, is a homonym of *Carinella* Sowerby, 1839. If it is thought worth while for the section mentioned to have a name, a new one must be found.

Geyeria Buckman, 1899, for a genus of Ammonites, is a homonym of *Geyeria* Bucheker, 1880.

Paratropis Boettger, 1891 (sect. of *Omphalotropis*), is a homonym of *Paratropis* Simon, 1889.

In 1890, Brauer and Bergenstamm gave the name *Paramenia* to a genus of Diptera from New Zealand. In 1891, Pruvot applied the same name to a genus of Aplacophora (Arch. Zool. Expér., ix). Under these circumstances, *Pararrhopalia* Simroth, 1893, regarded as a subgenus of *Paramenia* Pruvot, may stand as a genus; type *Purarrhopalia pruvoti* (*Paramenia pruvoti* Sims.). Typical *Paramenia* Pruvot may be called *Pruvotina*.

Ridleya Aneey, 1901, is later than *Ridleia* Dendy, 1888, but I think both may stand, by the difference of a letter.

Ischnodactylus Cossmann, 1890, is a homonym of *Ischnodactylus* Pels., 1886. *Pasithea* Hartman, 1881, invalidates *Pasithea* Meyrick, 1883, the first being a genus of Mollusca, the second of insects.

Zygænopsis Felder, 1874, prevents the use of *Zygænopsis* Rochebrune, 1884, proposed for a genus of Mollusca.

GENERAL NOTES.

ZONITOIDES ARBOREUS (Say) IN JAPAN.—In a recent lot of shells sent by Mr. Hirase, there are specimens of this common North American species, from Tokyo. The shells are quite indistinguishable from American specimens. One with the soft parts dried in enabled me to compare the dentition, which proves to be substantially that of the American species, the formula being 20.6.1.6.20. In a *Philadelphia arboreus* examined there are 19.6.1.6.19 teeth, the shapes of the individual teeth being the same in both. A slender, nearly straight dart, in a club-shaped sack, was found in the Tokyo specimen.

The form described by me as *Z. subarboreus*, from Hachijo island, Izu, is distinguishable chiefly by the somewhat larger size, and the same seems to be true of *H. yessoensis* Reinh., described from Hakodate, which is probably also a *Zonitoides*, but I have not yet seen specimens.—H. A. PILSBRY.

I have recently found a very fine reversed specimen of *Polygyra profunda* Say in Hamilton Co., Ohio, not far from Laurenceburg.—A. C. BILLUPS.

At the December meeting of the Section on Conchology of the Brooklyn Institute, the president of the Section, Dr. R. Ellsworth Call, exhibited a reversed specimen of *Mesodon exoleta*, which is very rare in that form.

Mr. Wm. H. Weeks, Jr., reported on a collecting trip on the coast of Maine, as follows:

“ *Shell Collecting on Cliff Island, Casco Bay, Maine.*—So much has been said regarding the conchologist at Casco Bay that little can be added. The writer spent a most delightful ten days at Cliff Island during last August and much of that time was spent in hunting mollusks. Shore collecting gave fine suites of *Purpura lapillus*, *Littorina palliata*, *Littorina littorea*, *Littorea rufis*, *Acmaea testudinalis* and *Macoma fusca*. A diligent search on shore for the famous *Buccinum undatum* revealed only dead specimens, but fishermen brought in fine suites found in lobster traps, also fine specimens of *Neptunea decemcostata* and *Sipho islandicus* found well out to sea. Dredging gave sparingly such forms as *Astarte sulcata*, *Nucula proxima*, *Lyonsia hyalina*, *Nassa trivittata*, *Pecten magellanicus*, *Modiola modiolus*, etc. *Polinices heros* was obtained at low tide well off shore

and *Helix hortensis* was in abundance on the island. A few *Helix albolabris* were also captured."—F. H. AMES.

PUBLICATIONS RECEIVED.

AN ANNOTATED CATALOGUE OF SHELLS OF THE GENUS PARTULA in the Hartman collection belonging to the Carnegie Museum. By Herbert H. Smith (Ann. Carnegie Mus. I, no. 3). The rich series of Partulæ brought together by Dr. W. D. Hartman, having passed with his collection into the possession of the Carnegie Museum, has now been catalogued, with full details concerning each of the 240 suites contained therein. The total number of species is 83, besides many named forms which Dr. Hartman regarded as varieties; in all 1,647 specimens. We feel rather skeptical about the specimens considered hybrids by Hartman (Catal., pp. 471-473). There is not much evidence of hybridism between really distinct species of Gastropods. The notes comprise the data accompanying each lot and more or less descriptive commentary on the shells themselves, but consist largely of extracts from the letters of Mr. Andrew Garrett, who collected the major part of the specimens. Within his province, Garrett was one of the best conchologists of his time, and his experience in the field gives his opinions on these shells great weight. The catalogue is arranged according to Dr. Hartman's latest MS.; and embodying as it does the results of both Hartman's and Garrett's mature thought on this difficult genus, it must be regarded as one of the most important papers on South Pacific land snails. Although Mr. Smith has modestly "abstained from expressing opinions and made only a few suggestions," his judicious notes earn for him the thanks of conchologists.

PRELIMINARY CATALOGUE of [Japanese] Marine Shells in the collection of the Natural History Department, Tokyo Imperial Household Museum. By T. Iwakawa. Part I, consisting of Cephalopoda, Pteropoda and Pectinibranchiata forms a book of 84 pp., recording 893 suites. Localities are carefully noted, both in English and Japanese, and the list will be chiefly useful to students of the Pacific fauna for the numerous definite Japanese localities. The known faunas of the Riukiu and Ogasawara groups, hitherto but little known, are largely increased by these records.



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12.

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ON THE SPECIFIC VALIDITY OF CAMPELOMA MILESII LEA.

BY BRYANT WALKER.

There has been considerable difference of opinion expressed, both in regard to the specific validity of this form and in regard to its relations to the other recognized species of the genus.

The types were collected by the late Manly Miles, formerly State Geologist of Michigan, in Branch Lake, Antrim county, in the extreme northwestern part of the State, and were described by Dr. Lea, in 1863.¹ Binney, in 1865,² included it in the aggregation which he assembled around *Campeloma decisa*. Dr. James Lewis, in his review of Binney's work in the Am. Jour. of Conchology,³ declared that it "has claims to the rank of a species that must be recognized." And later, in the same Journal,⁴ associated it with *decisa* in the group characterized by "shells of thin texture, whorls usually regularly rounded, suture well impressed, spire regular in proportion and, when perfect, acute."

Tryon, in his continuation of Haldeman,⁵ concludes that "it does not exceed the usual variation of *decisa*," and does not allow it even varietal rank. Call, in his elaborate paper "On the Genus Campeloma,"⁶ refers it to *C. subsolida* Anth. And in this he is followed

¹ Proc. Phil. Acad. Nat. Sci., 1863, p. 156.

² L. & F. W. Shells, Pt. III, p. 42 (1865).

³ A. J. of C., IV, p. 60 (1868).

⁴ A. J. of C., V, p. 33 (1869).

⁵ Mon. F. W. Univalve Moll., p. 28 (1870).

⁶ Bull. Wash. Coll. Lab. N. H. I., p. 155 (1886).

by Baker,¹ in his recent work on the "Mollusca of the Chicago Area." Lea's figure,² which is copied by Tryon, is either very poor or else represents an abnormal specimen. Binney's figure, which is stated to be from one of the types, is more accurate and represents the species as usually found at the present time.

Campeloma milesii has not as yet been recorded from outside the state of Michigan. In that State it has a well-defined and somewhat peculiar distribution and, wherever found, seems to preserve its essential characteristics as fully as any of the other recognized species of the genus (figs. 1, 2, 3, 4, 7, 8 and 9). It is an interesting coincidence, if nothing more, that its range is substantially the same as that of *Limnaea catascopium* and *Physa ancillaria magnalacustris*, which are the characteristic univalves of the shores of the Great Lakes and of the rivers and lakes in close proximity to them. The localities thus far recorded for *milesii* are the Detroit River, Saginaw Bay, Carp Lake and Crooked Lake Emmet county, Branch Lake Antrim county, North Lake on Beaver Island in Lake Michigan and the Pine River Marquette county. In most of these localities it is associated with *C. decisa* and in some with *C. rufa*. On the other hand, the range of *C. subsolida* in Michigan is quite different. This species on the eastern side of the State has not been found north of the Clinton River. On the western side it is abundant in the St. Joseph and Grand Rivers and apparently ranges as far north as Charlevoix, which is the only place where it has been found associated with *milesii*. Neither form has been reported from the interior of the State, and *subsolida* does not seem to be found in waters of any of the Great Lakes. From this, it is evident that the ranges of the two forms are quite different and only impinge in the extreme northwestern part of the lower peninsula.

Compared with *C. subsolida*, as found in the southern part of the State (fig. 11), and which is quite typical, it differs both in form and texture. *Subsolida* is a large, thick, heavy shell, with a blunt apex, sinuous lip and with a heavy white deposit on the parietal wall. It is practically free from erosion. On the other hand, *milesii* has a thin shell, a regularly-tapering, acute spire, a thin, transparent parietal callus, a much less sinuous lip, and is usually only about half the

¹ Moll. of Chi. Area, p. 361 (1902).

² Observations, XI, pl. 24, fig. 114.

size. It is extremely subject to erosion, and mature specimens with a perfect apex are comparatively rare. If, as has been stated, *milesii*, like *exilis*, is a sexual variation of *subsolida*, it is remarkable that it has not been found associated with that species in localities where that species is abundant, and it is still more remarkable that where it is found, its slender form is persistent and equally characteristic of both sexes. The only form of *subsolida* with which *milesii* can at all be compared, is the slender form from the Mississippi Valley known as *C. exilis* Anth. (fig. 10). Just what the relations of this form with the typical *subsolida* are, have never been satisfactorily explained. If, as generally considered, it is merely a sexual variation, it is a curious fact that it has never been found in any of the Michigan rivers where the typical form is abundant. But however that may be, while superficially resembling *milesii* in its slender elongated form, it differs, like the typical *subsolida*, in the shape of the spire, the less rounded whorls, and consequently less impressed suture, shape of the lip and texture. It seems clear, therefore, that *milesii* cannot be referred to *subsolida* even as a varietal form.

There yet remains to be considered its relation to the congeneric forms, with which it is frequently found associated. The characteristic color and texture of *C. rufa* are always sufficient to distinguish it, even when the erosion of the upper whorls has destroyed the outline of the more elongated *milesii*.

Lewis was quite right when he grouped *decisa* and *milesii* together, and it must be confessed that the exact relation of the two forms is not free from doubt. *Milesii* is more closely related to *decisa* than to any other species, and it is possible that when a greater abundance of material can be had, it may be relegated to varietal rank. But from our present knowledge, the forms seem quite as distinct as any of the more closely-related species of *Campeloma*, which are recognized, and it would seem better to keep them separate until their specific identity can be unquestionably established. Compared with *decisa* as it is commonly found, *milesii* is a thinner, more elongated shell, with a more acute apex; the upper whorls are more convex and the suture rather more deeply impressed; the aperture is smaller and narrower. This difference is well shown in the two forms as found together in the Pine River, Marquette county (figs. 9 and 12).

Then, too, there is a marked difference in the shape of the young when ready for extrusion. It will be remembered that Dr. Lewis

laid great stress on such differences in his study of this group, relying on the well-recognized principal that "marked differences in the embryos and young of a class of beings are specific." The young *milesii* when ready for extrusion is uniformly larger than the young of *decisa* (*milesii* 4.75 x 3.50, *decisa* 4.25 x 3.50 mill., specimens figured). The shell is more slender and noticeably more elongated, the apex being well elevated above the next whorl, while in *decisa* the apex is depressed, giving a planorboid shape to the apex, and rises scarcely if at all above the second whorl. This difference, shown by figs. 5 and 6 from the two species as found together in the Detroit River, is characteristic and persistent. There is no substantial variation in the young of the Detroit River *milesii*, and none in fourteen different lots of *decisa*, from localities as widely separated as Port Cram, N. J., Detroit River, Grand Rapids and Marquette county, Michigan. The color in both forms is the same, a pale green, and both have raised revolving lines of epidermal tissue.

It is unfortunate that no detailed anatomical examination of either species has ever been published. It is quite possible that when that is done, other differences will be found which will confirm the view herein expressed. In the meantime, it certainly seems advisable to recognize the specific validity of this interesting form.

EXPLANATION OF PLATE V.

1. *Campeloma milesii* Lea. Detroit River, Michigan.
2. *Campeloma milesii* Lea. Detroit River, Michigan.
3. *Campeloma milesii* Lea. Detroit River, Michigan.
4. *Campeloma milesii* Lea. Saginaw Bay, Michigan.
5. *Campeloma milesii* Lea. (Young.) Detroit River, Michigan.
6. *Campeloma decisa* Say. (Young.) Detroit River, Michigan.
7. *Campeloma milesii* Lea. Charlevoix, Michigan.
8. *Campeloma milesii* Lea. Carp L., Emmett Co., Michigan.
9. *Campeloma milesii* Lea. Pine River, Marquette Co., Mich.
10. *Campeloma exilis* Anth. Illinois River, Illinois.
11. *Campeloma subsolida* Anth. Clinton River, Macomb Co., Mich.
12. *Campeloma decisa* Say. Pine River, Marquette Co., Mich.

THE LAND SHELLS OF CALHOUN FALLS, S. C.

BY A. C. BILLUPS, LAWRENCEBURG, IND.

Local lists of shells, no matter how incomplete they may be, are always useful to those interested in the study of geographical distribution, and without them no work could be done in that branch to any degree of satisfaction.

Many collectors fail to make these lists because they deem them of little special interest, and because they feel they can give no account of any new thing. These lists of themselves form no article of great interest when taken singly, but when a large number of them, covering a large area of country, are brought together, they form a most valuable source of information to the specialist. It should be the aim of every naturalist to add his share to the sum of general knowledge, no matter how small that share may be, and for these reasons I feel it not wasted time to give the result of one day's hunt, in what most likely is an unworked locality.

This day's work took place at a bad time of year, on a cold, bright morning on the 9th of December, 1900, at a place known on the map as Calhoun Falls. I say on the map, as the Falls proper are a long three miles from the hotel, general store and saw mill bearing that name. They treated me well, however, at the hotel, as some sportsmen had spent the day there and had added a quantity of delicious game to the usual southern country fare of "hog and hominy." Between the combined resources of hotel and sportsmen, I put away one of the best dinners I ever sat down to, and one which I shall long remember.

Calhoun Falls, S. C., is in Abbeyville county, on the Sea Board Air Line, about twenty-five miles southwest of Greenwood, South Carolina, and fifty miles east of Athens, Georgia.

The country two miles back from the river is of a very sandy soil, interspersed with red clay, and the timber principally pine. The creeks are all small, sandy and swift, running over a bottom composed only of sand, and occasionally a few yards of bare rock buried in sand; they contain no molluscan life whatever, and time spent in their investigation is wasted.

The Savannah River, at a point about half a mile below the railroad bridge, breaks into a series of falls, or rather rapids, full of small

islands and rocks, and two miles below attains a width of nearly three-fourths of a mile. A few of these islands are of fairly large extent and heavily wooded with pine and oak.

The rapids extend for a distance of five miles and bear the same character throughout, the rocks all rest upon a clean, sandy bed, and over the entire length of the rapids I could find no trace of water shells of any description. The streams in this section of the country all seem to be alike in this respect, with the exception, perhaps, of Clear Creek, a stream about three miles from this point, which is said to contain large quantities of *Unio* of which, however, I have had none other than oral evidence.

The banks of the river on the South Carolina side are in many places very steep and covered with hard-wood timber. I may here state that it is only wasted time to attempt to find shells under pine logs. I have tried it often and always with the same results, namely, a tired back, torn hands, a considerable gain in bodily temperature, and few if any specimens to add to the bottle. As an athletic exercise it is without an equal, but from a collector's point of view, a decided failure.

Beginning at the railroad bridge and working down stream, comes a stretch of bottom land covered by one of the most dense cane brakes I ever saw, extending to the water edge, and which gives evidence of being submerged at high water. I turned many logs at this point but they were in too close contact with the clear sand and produced nothing.

Beyond and below this cane brake the banks of the river rise at a distance of fifty yards from the water to quite steep hills, thickly timbered with oak and maple, and the soil of a much more solid consistency. Here, under logs on the hill side, I found *Polygyra appressa* Say, *Polygyra stenotrema* Fer. and several *Zonitoides*, together with a few specimens of *Polygyra tridentata* Say. Under one log I found a colony of *Polygyra barbigera* Redf., but a most careful search under many other similar logs near by failed to discover any more. On the bottom land several water-soaked and spongy logs produced *Gastroponta interna* Say and *Zonitoides elliotti* Say in great numbers, they were all obtained by picking the wood apart with a knife and shaking out the shells into a handkerchief. The contrast between the light delicate pink of the former and the pale green of the latter was very marked and beautiful.

After leaving this part of the bank I traversed two miles of red clay soil, covered with pine and shrub, which, though most carefully searched, produced nothing whatever. Below this, several streams were crossed, containing nothing but the usual sand and water.

The banks now become very steep and in many places the bare rocks are exposed, badly cracked and weather-worn. Here in the crevices of the limestone, so far back as to require the aid of a stick to reach them, I found some beautiful specimens of *Polygyra obstricta* Say, a few alive and many dead, at the base of the cliff.

Numerous specimens of *Polygyra* and *Pyramidula* were found among the loose and broken fragments of stone, which were here piled in great profusion, between the cliff and the river, but which were all above high-water mark.

Beyond this place, where the rocks are less numerous and covered by a rich, black soil, I took a few fine specimens of *Polygyra albolabris major* Binn. alive and also found many dead and broken shells.

From this point I left for the hotel, by what I took to be a short cut through the woods but which proved to be very far from an air line. I reached home, however, after about a two hours' tramp, having spent one of the most enjoyable days I can remember, and well satisfied with the results of my trip. It must be remembered that this tramp was made at a very bad time of year and when all shells were in their winter quarters.

The following is a complete list of all the material taken :

SHELLS TAKEN AT CALHOUN FALLS, SOUTH CAROLINA.

Polygyra tridentata Say. A large, dark-colored shell, found quite plentifully among the loose rocks and broken fragments.

Polygyra tridentata var. A much smaller shell than the preceding, showing a pinkish shade about the lip. Scarce, and in company with the above.

Polygyra ringeli Shutt. Quite common under logs.

Polygyra inflecta Say. Under logs and among loose stones.

Polygyra albolabris major Binn. Under logs and chips in the black soil.

Polygyra palliata Say. Eight specimens from the heavily-timbered hill side.

Polygyra obstricta Say. From the cracks in the limestone cliffs.

Polygyra appressa Say. Among the loose stones with *tridentata*.

Polygyra elevata Say. Four dead shells only, in drift near the river.

Polygyra thyroides Say. Two dead and one living, on the hill side.

Polygyra barbigera Redf. A numerous colony under one log only, evidently in their winter quarters.

Polygyra stenotrema Fer. A small number, not common and generally distributed.

Polygyra stenotrema exodon Pils. Very common under the logs and loose stones. (Determined by Bryant Walker.)

Polygyra hirsuta Say. One or two specimens only.

Circinaria concava Say. Five adult and several partly-grown shells found, under leaves, logs and stones on the hill side.

Omphalina fuliginosa Griff. Several specimens, deep in thick beds of leaves.

Gastrodonta intertexta Binn. A few fine shells, in the earth under the logs.

Gastrodonta interna Say. Large numbers, in water-soaked logs near the river.

Zonitoides arboreus Say. Quite common, under the bark and in rotten wood.

Zonitoides ellioti Redf. Large numbers, in water-soaked logs.

Pyramidula alternata Say. A strongly-ribbed variety. Quite plentiful, under the large loose rocks.

Pyramidula perspectiva Say. Quite common, in decayed logs on the hill side.

Pyramidula striatella Anth. Scarce, in company with *P. striatella*.

Helicodiscus lineatus Say. Ten specimens, under bark of dead wood.

NEW LAND SHELLS OF THE JAPANESE EMPIRE.

BY H. A. PILSBRY AND Y. HIRASE.

Helicina sadoensis Pils. & Hir., n. sp.

Shell depressed and acutely carinate, about equally convex above and below, dull red or reddish-yellow, sculptured with fine, irregular wrinkle-striæ and very fine, crowded spirals above and below. Spire low-conic with somewhat convex outlines. Whorls about 4, the last convex below, not descending in front. Aperture oblique, of the

usual shape; lip well expanded and thickened; a noticeable angle at the base of the columella. Umbilical callus small but rather thick, pox-marked. Operculum is sparsely granulose and retracts barely within the lip. Alt. 2.5, diam. 4.5 mm., to alt. 3, diam. 5 mm.

Sotokaifu, Sado. Types no. 84380, A. N. S. P., from no. 991 of Mr. Hirase's collection.

Related to *H. hakodadiensis* Hartm., but quite distinct by its acute peripheral keel.

Alycæus harimensis var. *sadoensis* n. v.

Similar to *A. harimensis* in size, form and striation, but the strongly constricted neck is quite smooth, the umbilicus is noticeably wider, the reflexed sutural process is more prominent, and the peristome is much thickened outside and beveled towards the edge.

Aikawa, Sado. Types no. 83895 A. N. S. P., from no. 996 of Mr. Hirase's collection.

Macrochlamys perfragilis var. *shikokuensis* Pils. & Hir., n. v.

Shell depressed, yellow, subtransparent, with the form of *M. perfragilis* Pils., of Oshima, Osumi, but with the same number of whorls it is much smaller. It is also very similar to *M. dulcis* Pils. in shape, but the umbilicus is narrower and almost closed by the triangular reflection of the columellar lip, and the very glossy surface is smooth, without the spiral lines of *M. dulcis*. Whorls $4\frac{1}{2}$, alt. 6.5, diam. 13 mm.

Kotsuzan, Awa (Shikoku). Type no 84259 A. N. S. P., from no. 1000 of Mr. Hirase's collection.

Microcystina higashiyamana Pils. & Hir., n. sp.

Shell minutely perforate, conic, brown, somewhat transparent, glossy, and marked with fine, indistinct growth-lines. Spire conic, the apex obtuse. $5\frac{1}{2}$ convex whorls, very slowly widening, the last distinctly angular at the periphery, convex beneath, a little impressed in the middle of the base. Aperture oblique, somewhat lunate, the outer lip simple, columellar lip turned back, strengthened by a nearly vertical white callus a little way within. Alt. 2.2, diam. 3 mm.

Higashiyama-mura, Awa, Shikoku Island. Type no. 84379, A. N. S. P., from no. 1002 of Mr. Hirase's collection.

Distinguished by the conic, *Kaliella*-like shape and the white callus within the columellar margin.

Buliminus andersonianus var. *echigoensis* P. & H., n. var.

Shell similar to *B. andersonianus* Middff. except that the spire is a little wider, not quite so straightly conic, and the size is much greater. Dark vinous-brown with a green-buff border below the suture, the mouth purple-bordered inside.

Length $29\frac{1}{2}$ to $30\frac{1}{2}$, diam. 11 to $11\frac{1}{2}$ mm.; whorls fully 8.

Myokōzan, Echigo. Types no. 83896 A. N. S. P., from no. 750a of Mr. Hirase's collection.

B. andersonianus was originally described from Yesso; but Mr. Hirase has found it not only in Ojima, the southern province of that island, but also in the province Uzen, in Nippon (Ilondo); the specimens being typical. This large race is from still farther south.

HELICINA JAPONICA AND RELATED FORMS.

BY H. A. PILSBRY.

Helicina japonica was described from "Tabu-Sima," that is, Tobishima, an islet of the Province Ugo, on the west coast of Nippon. Adams gave no dimensions; but the figures in Sowerby's *Thesaurus Conchyliorum*, which were evidently drawn from his specimens, measure alt. 8, diam. 9.6 mm. However, even where no size-mark is given in the *Thesaurus*, the figures of many small species are slightly enlarged. Thus, on the same plate with *H. japonica*, the figures of *H. convexa*, *concinna*, etc., are enlarged, while those of some other species are not so. Therefore the dimensions of these figures cannot be relied upon as showing the true size of *H. japonica*. The specimens before me from Tobishima, the type locality, measure alt. 6, diam. 8 mm., or are a little smaller, alt. 5, diam. 7.2 mm. The surface is glossy or dulled by slight erosion, and is rather *finely but deeply striate*. The lip is expanded and in fully adult shells is duplicate, and very much thickened on the face. The moderately thick basal callus is densely, conspicuously roughened. The specimens from Sado are like those of Tobishima, but of a dull red-brown color. A larger race, diam. 9.5 to 10.5 mm., red, or sulphur-yellow, glossy and handsome, occurs at Kashima, Harima. It has the fine sculpture of typical *japonica*.

H. reinii Kobelt, described as a variety of *H. japonica*, is much larger, alt. 10, diam. 14 mm. The type locality is unknown, but

specimens exactly typical occur at Ibuki, Omi. It is much less striate than *japonica*. In the specimens I have seen the surface is dull from loss of the cuticle, which is evidently deciduous and very thin. It varies in color from white or sulphur-yellow to deep crimson. Some shells from Kotsuzan, Awa (Shikoku) having all other characters of *reinii*, have the last whorl covered with glossy cuticle like the small form *expolita*. *Reinii* may prove to be specifically distinct from *H. japonica*, and for the time being may be so considered.

The various forms may be tabulated thus:

I. Shell distinctly striate or costulate (*H. japonica*).

1. Striation close and fine.

- a. Diam. 7 to 8 mm., typical *H. japonica*.
- b. Diam. 9 to 11 mm., *H. japonica*, var. from Harima.
- c. Diam. 15 to 16 mm., *H. japonica* var. *uzenensis*.

2. Very coarsely ribbed; diam. 10-11 mm., *H. japonica* var. *echigoensis*.

II. Surface not distinctly striate (*H. reinii*).

- 1. Surface dull, denuded of cuticle; diameter 12 to 15 mm., typical *H. reinii*.
- 2. Surface covered with a smooth, polished cuticle; diam. 10 to 13 mm., *H. reinii* var. *expolita*.

H. j. echigoensis is a new variety from Omimura, Echigo, types no. 84384, A. N. S. P., from no. 575a of Mr. Hirase's collection. It is strongly and coarsely ribbed.

A NEW CONUS FROM THE TERTIARY OF FLORIDA.

BY T. H. ALDRICH.

Conus waltonensis n. sp.

Shell medium in size, substance rather thin; spire elevated, with nine whorls, including the apex, which is rather sharp, profile of spire slightly broken by a shoulder just above the suture on each whorl, the suture impressed, each whorl of the spire concave, and marked by numerous curved lines; periphery sharp; body whorl below the keel in some specimens over one-half smooth, then below this bearing two or three spirals of evenly-spaced nodules without any grooves between, gradually changing to rows of nodules on bands

between grooves, which are eight or ten in number, the nodules fading away as the canal is reached, but in the type specimen the nodules are present over the whole of the smooth part without, however, any grooves between. Anal notch rather deep, and marking the spire



with its former positions; outer lip thin, pillar lip straight with a very slight twist; aperture straight above, widening near the base.

Length 20 mm., max. diameter 12 mm.

Locality: Shoal Creek, Walton county, Florida.

Remarks: This shell bears a close resemblance to *Conus puncticulatus* Hwass, and is doubtless an ancestral form, thus adding another link to the chain of evidence of a connection between the Atlantic and Pacific Oceans during Tertiary times.

This species has been in my possession for many years and until lately was not known to me from any other locality, but on looking over some specimens of fossils from the Number 2 well of the Mobile Oil Co., bored near Mobile, Alabama, I found two or three specimens of it, and from its position over three hundred feet above the Oak Grove (Fla.) horizon in this well, it would seem to indicate that this deposit on Shoal Creek is much younger than the Oak Grove beds. The assignment of these beds to the Oligocene must, in the writer's opinion, be better substantiated than at present. There are so few species common to the "Chipola" of Dall and the Vicksburg formation, it would seem better to confine the use of the term "Oligocene" to the latter, which is in accordance with Conrad's original diagnosis, and put the Chipola, Shoal Creek and Chattahoochie beds into one formation, calling them all Miocene, and if this should eventually be done, then this formation should bear the name its discoverer, D. W. Langdon, Jr., gave it of "Chattahoochie."

D. G. Harris figures a *Conus puncticulatus* Hwass from the Galveston deep well. It is probably the same species as the one herein described. The pustules on the living shell appear to be in the grooves while on the fossil form they are between them.

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MOLLUSKS OCCURRING IN SOUTHERN CALIFORNIA.

The following species, not heretofore made known as occurring in Southern California, have been detected in Los Angeles and elsewhere in this part of the State within the past two years. The large slug *Limax maximus* first observed in the southeasterly part of Los Angeles, has been quite numerous. It is found in considerable abundance in many localities in the Walnut Grove Tract, including my own grounds. Its color caused me to doubt its identity, so I sent specimens to Dr. Pilsbry. He referred them to the foregoing species with the comment, "that it was not the common form, but a melanistic variety which I have never seen from the East." Another slug determined by Dr. Pilsbry for Mr. Williamson is *Limax flavus*, occurring in Los Angeles, apparently rare as yet. In March, last year, I detected a few examples of *Punctum conspectum* Bland, on my lawn near the water faucet; some 9 or 10 specimens; these were named by Professor Dall. I have failed to find further examples after careful search. *Vallonia pulchella*, so exceedingly abundant on my grounds in August, 1900 (see the NAUTILUS, Vol. XIV, pp. 65-67) is now quite scarce.

Mr. Hemphill reports *Limax maximus* as occurring in San Diego in the nursery of the well known florist, Miss Kate O. Sessions of that city.

The appearance and disappearance of forms like *V. pulchella* and *P. conspectum* is not easily explained.

Helix aspersa became exceedingly abundant on my premises, so numerous as to be a pest; by persistent search it is now nearly ex-

terminated. The hunt will have to be kept up, else it will soon become as abundant as ever.

ROBT. E. C. STEARNS.

Los Angeles, Feb'y 24, 1903.

DESCRIPTIONS OF NEW JAPANESE LAND SHELLS.

BY H. A. PILSBRY AND Y. HIRASE.

Chloritis tosannus n. sp.

Shell umbilicate, depressed, the spire but slightly convex, very thin, uniform brown. Surface slightly glossy, closely set with short hairs arranged in regular oblique rows. Whorls $4\frac{3}{4}$, very convex, separated by a deeply excavated suture, the last whorl rounded peripherally and beneath. Aperture slightly oblique, rounded-lunate; peristome thin, acute and not expanded except at the columellar insertion, where it is widely dilated, partly covering the umbilicus. Alt. 10, diam. 17.5 mm.

Shinjo-mura, Tosa. Type no. 84415. A. N. S. P., from no. 1015 of Mr. Hirase's collection.

This species is the first *Chloritis* found in Shikoku. It is very like *C. perpunctatus*, but about twice the size. In *C. fragilis* the hairs are much more widely spaced. *C. hirasei* is far more widely umbilicate.

Eulota (Cælorus) cavitectum n. sp.

The shell resembles *E. cariconus*, but is larger, not quite so high, the umbilicus contracting more rapidly within. Brown; covered with oblique cuticular threads and small scales, the scales predominating on the last whorl and base. Whorls $6\frac{1}{3}$, slightly convex, the last strongly carinate at the periphery, a little convex beneath, descending rather deeply below the keel in front. The aperture is nearly horizontal, transversely oval. The peristome is brown, thin, the upper margin not expanded, lower margin reflexed, bearing a white tubercle on the inner margin. Alt. 5, diam. 10 mm.

Kochi, Tosa. Type no. 84416. A. N. S. P., from no. 1033 of Mr. Hirase's collection.

E. cariconus of western Kyushu is smaller, has more whorls, a well-like umbilicus, and finer sculpture, the cuticle of *E. cavitectum*

being roughened like that of a *Plectotropis*. It is the first *Cælorus* found in Shikoku Island.

Trishoplita lischkeana var. *hizenensis* n. var.

The shell is transparent-whitish, with a red-brown band at the periphery, which is angular in front, becoming rounded on the latter part. The band ascends above the suture. The surface is glossy, and under the lens is seen to be very finely striate, and decussate by very close, fine, shallow spiral striæ. Whorls $4\frac{1}{2}$. The umbilicus is about one-eighth the diameter of the shell. Peristome thin, expanded below, hardly so above.

Alt. 5.8, diam. 9 mm.

Alt. 5.3, diam. 8.8 mm.

Ukujima, Hizen. Types no. 84414. A. N. S. P., from no. 1019 of Mr. Hirase's collection.

This little shell has the red-brown band and decussate surface of the much larger shell I described as *T. collinsoni* var. *okinoshimæ* (Proc. Acad. Nat. Sci., Phila., 1901, p. 547). It is also related to *T. c. var. casta* (NAUTILUS XV, p. 19), also a larger shell, from the province Hiuga, in eastern Kyushu; and to *T. lischkeana* (Kobelt), from Hagi, Nagato, on the northwestern coast of southwestern Hondo (Nippon). *T. lischkeana* is more elevated than *hizenensis*, and though compressed, the last whorl is not angular. Otherwise the two forms seem to be alike, so far as we can tell from the published description and figures of *lischkeana*.

One of the present authors, in referring these forms to A. Adams *collinsoni* some years ago (NAUT. XV, 19), was influenced by the belief that the locality "Tago" given for that species was situated in western Shikoku but this was an error, Tago being a seaport of the province Izu, on Suruga Gulf; and as *collinsoni* is described as a decidedly more globose shell than *casta*, etc., though similarly colored, it will probably prove to be specifically distinct from the forms *casta* and *okinoshimæ*.

Trishoplita mesogonia var. *shikokuensis* n. var.

The shell is similar in form to *T. mesogonia* (Pils.), but differs in sculpture, being very closely and finely striate spirally. The types are red-brown, fading towards the suture and base, with a pale line at the angular periphery, and more or less streaked with whitish-corneous. Whorls $5\frac{1}{2}$. Alt. 7.3, diam. 11 mm.

Sodayama, Tosa. Types no. 84412. A. N. S. P., from no. 1016 of Mr. Hirase's collection.

T. mesogonia is from the province Tango in western Hondo, Hilizan on the western side of Lake Biwa, etc. It varies from reddish-brown to nearly as pale as *T. goodwini*. The variety from Shikoku is similar in shape, but constantly different in sculpture. The types are variegated as described above. A series from Kochi, Tosa (Mr. Hirase's no. 580), has neither the pale peripheral band nor the streaks of the shells from Sodayama, and varies from pale brown to nearly as light a tint as *T. goodwini*. Specimens of this lot were compared by Mr. Gude with his *T. goodwini* var. *carinata*, and said to "differ in the body-whorl, and the aperture is smaller and more rounded." Others were found at Suimura, Awa (Shikoku), Mr. Hirase's no. 823, like the Kochi lot.

Arinia japonica n. sp.

The shell is very minute, gray, cylindric, terminating above in an *extremely short, low brownish cone* of hardly two whorls. Surface lusterless, sculptured with narrow ribs, like a *Diplommatina*. These ribs are fine and rather close, but on the last whorl they become *very widely spaced*. Whorls $5\frac{1}{3}$, convex, the last whorl distorted, being smaller than the preceding whorl, and strongly ascending in front. It is very shortly and inconspicuously rimate. The aperture is vertical and circular. The peristome is continuous, very narrowly expanded, and thickened outside behind the edge. The columella is simply concave. Length 2, diam. 1.2 mm.

Goto, Hizen. Types no. 84413. A. N. S. P., from no. 1018 of Mr. Hirase's collection.

This tiny snail is the first *Arinia* from Japan, and by far the most northern of its kind. It is remarkable for the very obtuse summit.

ILLUSTRATIONS OF SOME JAPANESE LAND SHELLS.

Several of the Japanese snails described in the *NAUTILUS* during the past year or two are illustrated on the plate accompanying Mr. Hirase's catalogue of Japanese shells inserted in our advertising pages this month. As some of them have not before been figured, it seems proper briefly to refer to them.

The *Euhadra* section of *Eulota* is represented by two fine species. Fig. 3 is *E. callizona* var. *dixoni* Pils. (NAUTILUS XIV, p. 60). This elegant shell is from the province Idzumo. It is named for the President of the Academy of Natural Sciences. Fig. 4, *E. senckenbergiana* var. *awaensis* Pils., is a race from Shikaku of the species from western Japan, the largest Japanese Helix. Figs. 5, 6, *Plectrotropis elegantissima* var. *cara* Pils. (NAUTILUS for Jan., 1901, p. 107) is from Great Riukiu Islands.

Ganesella Pargillierti Phil., from the same island (fig. 13), is a very characteristic Riukiuian snail; and fig. 1, *G. myomphala* Mart., is the largest Japanese member of the same genus, and to my eye, one of the most beautiful Helices. It is rather widely distributed in southern Japan.

Clausilia martensi var. *reiniana* Kob., is the largest living *Clausilia*. It is not an uncommon species in central Japan.

Cyclophorus hirasei Pils. and *Pupinella oshimæ* Pils. are two operculate forms from the island of Oshima, in the "Riukiu Curve."

Figs. 7-10 belong to the wonderful fauna of the Bonin Islands (Ogasawara-jima). These mere dots on the great Pacific have a varied snail population of about 50 species, all but half a dozen discovered by Mr. Hirase's collectors, chiefly by Mr. Nakada, whose work is deserving of high praise. Fig. 7 is the var. *trifasciata* of *mandarina mandarina* Gray, from Nakanojima, a little islet not shown on ordinary maps. The genus *Mandarina* comprises a half dozen species, the largest, *M. ruschenbergeriana* Pils., NAUTILUS IV, p. 64, figs. in text, exceeding our big *Polygyra chilhoweensis* in size. It was supposed before Mr. Hirase's explorations, to be from the Riukiu Is. The species of *Mandarina* are all from the Bonin Is., and are strong, solid shells, related to a Chinese group of which the common *Camæna cicatricosa* is a well-known member. Fig. 8 is *Fametesta mirabilis* Pils., from Hahajima, the southern large island of the Ogasawara group. The name "wonderful starved shell" is from its lank, emaciated appearance. *Hirasea profundispira* Pils., fig. 9 (NAUTILUS XVI, p. 47), is one of the numerous genus *Hirasea* (NAUTILUS XV, p. 118), consisting of small shells very peculiar in shape. *Hirasiella clara* Pils., fig. 10 (NAUTILUS XV, April, 1902), is the sole representative of a related genus. These genera are all confined to the Ogasawara-jima.

HABITS OF ACANTHOPLEURA GRANULATA.

BY S. H. HAMILTON.

The south coast of Cuba west of Santiago de Cuba is a sharp, dock-like escarpment bounded by very deep water. In the cavities of the coraline rock, from ebb water to that just wetted by each wave, are the homes of this chiton. The impact of the waters of the Caribbean against this coast, not being broken by any beach or shallow water, is often very powerful and destructive. I observed that with each successive wave the chitons brought their girdles flush and tight with the rocks, while during slack water they raised, so as to let the receding fluid circulate freely around their gills. At the time of my visit to Cuba I was unacquainted with the visual organs of the tegmentum, and supposed that *Acanthopleura granulata* had acquired a rhythmic movement by experience and was so enabled to live in a more exposed situation than other mollusks. It now seems evident to me that the megalapores are so well developed in this species that it can perceive the oncoming wave before it strikes.

TEMPLE PRIME.

In the death of Temple Prime, which occurred on the 25th of February last, another of the old-time Conchologists has passed away. Mr. Prime was born in New York City seventy years ago, and after graduating at Harvard, studied law but never practised. He was greatly interested in science, particularly Conchology, and studied with Professors Agassiz and Silliman. In the early sixties he published numerous papers, mostly in the *Proceedings of the Acad. Nat. Sciences, Philada.*, upon the *Cyclades*, in which he was especially interested and an authority. His exhaustive Monograph of the Corbiculidae was published under the auspices of the Smithsonian Institute, Washington.

Mr. Prime was also a student of Genealogy and History, and at the time of his death was at work on a French history. He was actively interested in political affairs, being what is called an Independent, and in 1860 was secretary of legation at The Hague, Holland. As president of the Citizens' League for good government in Huntington, he took a lively interest in local affairs and was a large con-

tributor towards its educational and other interests, notably the Soldiers and Sailors Memorial Association, the indebtedness of which he greatly reduced and finally cancelled.

Personally Mr. Prime was a generous friend, ever ready to help any worthy cause with purse or counsel, and he will be greatly missed in the community in which he spent so many years of his life.

S. RAYMOND ROBERTS.

PUBLICATIONS RECEIVED.

SYNOPSIS OF THE FAMILY VENERIDÆ AND OF THE NORTH AMERICAN RECENT SPECIES. By. Wm. H. Dall (Proc. U. S. Natl. Mus. xxvi, 335-412, plates xii-xvi, 1902).

This synopsis gives in condensed form the results of another of Dr. Dall's elaborate studies on the Pelicypods. The revision of the nomenclature involved a great amount of work, necessitating many generic and specific changes. A complete bibliography is given, followed by the synopsis of classification of the genera and sub genera, and a revision of the species with descriptions of twenty new species.

Dr. Dall divides the *Veneridæ* into four sub-families: *Dosiniinæ*, *Meretricinæ*, *Venerinæ*, *Gemmínæ*; represented on the Atlantic coast by 59 species, and on the Pacific by 80 species, two being natives of both oceans.

From the Atlantic and Gulf coasts of the United States the following species are recorded: *Dosinia concentrica* Born.; *D. elegans* Con.; *D. discus* Rve.; *Transenuella cubaniana* Orb.; *T. stimpsoni* Dall; *T. conradiana* Dall; *Gouldia cerina* C. B. Ads. is now placed in the genus *Gastrarium* Bolten 1798, and *Macrocallista nimbosa* Solander 1786, is adopted in place of *Cultista gigantea* Gmel. 1792; *M. maculata* L.; *Callocardia* (*Agriopoma*) *morrhuana* Linsley, replaces *Cytherea convexa* Say (not Brong.), and *C. sayana* Con., the two latter names were applied to the Miocene form which is considered distinct from the recent. *Callocardia teresiana*, Dall; *C. zonata* Dall; *Pitaria albida* Gmel.; *P. fulminata* Mke. (*Cytherea varians* Hanley); *P. simpsoni* Dall; *P. eucymata* Dall, and *P. (Hysteroconcha) dione* L. The latter is more familiarly known as *Dione dione* or *D. veneris* Desh. By elimination the genus *Cytherea* Bolton 1798 should be restricted to form like *C. listeri* Gray (*Venus*

crispata Desh.), *C. rigida* Dillw. 1817 (*V. rugosa* Gmel. 1772, not Linn. 1771), *C. rugatina* Heilp. and *C. strigillina* Dall. *Cyclinella tenuis* Recl. (*Lucinopsis tenuis*); *Chione cancellata* L. (*Venus cancellata*), *C. subrostrata* Lam. (*V. beaufi* Recl.), *C. mazyckii* Dall; *C. intapurpurea* Con.; *C. grus* Holmes; *C. pygmaea* Lam.; *C. paphia* L.; *C. latilirata* Conr. (*V. varicosa* Sowb.); *Anomalocardia brasiliiana* Gmel. (*Venus flexuosa* Born, not Linn., and *V. macrodon* Hanley are syn.) *A. cuneimeris* Con. (*V. rostrata* Sowb.); *Venus mercenaria* L.; *V. campechiensis* Gmel. (*V. mortoni* Con.), *Liocyma fluctuosa* Gould; *Gemma gemma* Tott.; *G. purpurea* H. C. Lea (*G. concentrica* Dall.), and *Parastarte triquetra* Con.

From the Pacific coast north of Mexico the following are received: *Dosinia ponderosa* Gray (Pleistocene only, on the California coast), *Transennella tantilla* Gld.; *Tirela* (*Pachydesma*) *stultorum* Mawe. (more familiarly known as *Pachydesma crassatelloides* Conr.), *Amiantis callosa* Con.; *Pitaria newcomiana* Gabb.; *Cytherea fordii* Yates; *Saxidomus mutallii* Conr.; *S. gigantea* Desh.; *Chione fluctifraga* Sowb.; *C. undatella* Sowb. (*V. simillima* Sowb.); *C. succincta* Val.; *Venus kennicottii* Dall; *Marcia kennerleyi* Rve.; *M. subdiaphana* Cpr.; *Paphia* (*Protothaca*) *staminea* Conr. The genus *Paphia* Bolton 1798, replaces *Tapes* Megerle 1811, the latter is however used as a sub-genus. Five varieties of *P. staminea* are recognized *Petiti* Desh. (*rigida* Gould); *laciniata* Cpr.; *ruderata* Desh.; *orbella* Cpr., and *sulculosa* Dall. *P. tenerrima* Cpr.; *Liocyma beckii* Dall; *L. viridis* Dall; *L. scammoni* Dall; *Venerupis lamellifera*, *Psephidia lordi* Baird (*Psephis lordi*), *P. ovalis* Dall, and *Gemma gemma* Ton., the latter introduced into San Francisco Bay on "seed" oysters.

A number of forms on the Pacific coast are closely related to species of the Atlantic fauna, and probably had a common ancestry when the two oceans were connected at the isthmus. *Dosinia ponderosa* "recalls somewhat the Atlantic *D. concentrica*;" *Tirela byronensis* Gray (*T. radiata* Sowb.), is "the analogue of *T. macrotroides* Born of the Antilles;" *Macrocallista squallida* Sowb., is the analogue of *M. maculata* of the Atlantic fauna, and *Calloocardia catharia* Dall, is represented in West Indies by *C. aresta* Dall and Simpson; *Pitaria tomeana* Dall is "the apparent analogue of *P. fulminata* of the Atlantic fauna." *P. (Hysteroconcha) lupanaria* Less. is "a larger but less elegant analogue of the Antillean *P. dione* L., easily recognized by the violet spots at the base of the spines;"

P. (Lamelliconcha) circinata of the Atlantic can hardly be separated from *P. alternata* of the Pacific; *Cytherea magdalena* Dall is the analogue of *C. strigellina* Dall, of the Atlantic fauna; *C. rigida* Dillw. is found on both shores; *C. multicostata* Sowb. is allied to *C. listeri*; *Chione subrostrata* lives on both coasts; forms of *C. undatella* often resemble *C. cancellata*; *C. purpurissata* Dall is closely related to *C. puber* Val.; *C. pulicaria* is the analogue of *C. intapurpurea* of the Atlantic fauna; while *C. obliterata* Dall "is the analogue of *C. latilirata* Conr., and *C. mariæ* Orb. of *C. paphia* L."—C. W. J.

REVISION DES CYPRÆIDE DE LA NOUVELLE-CALEDONIE, par Ph. Dautzenberg, Journal de Conchyliologie, Vol. L, pp. 291-384, 1902. In this interesting paper the author records about 70 species, and a number of varieties including several which are described as new. The following is a brief review of the new forms:

CYPRÆA ARGUS var. MINOR, applied to specimens under 55 mm. in length.

C. ARGUS var. CONCATENATA, shells with numerous small ocellated spots disposed in small chains, which cross each other more or less regularly; at the points of intersection the remarkably large rings sometimes transform into brown spots.

C. CARNEOLA var. PROPINQUA Garrett (Cat'l *Cypræidæ*), very short, reflected, approaching in form *C. arenosa*, dorsal region with a violet ring more or less apparent.

C. TALPA var. SATURATA. In this variety the three dorsal bands are less clearly defined, the entire shell being tinted with a deep brown.

C. TABESCENS. *C. rashleighana*, *C. alveolus*, and *C. elaiodes* are all considered varieties of *C. tabescens*.

C. CAURICA var. PALLIDA. This has the form of var. *obscura* Rossiter, but tending to albinism, while var. *obscura* tends to melanism.

C. ARABICA var. ATRA. Tinted with black over the entire dorsal surface. This var. corresponds to the var. *nigricans* of *C. eglatina*.

C. EGLATINA var. PALLIDA. Based on two shells with very marked tendencies to albinism.

C. MISTRIO var. LUCTUOSA. This presents exactly the same ex-

tent of melanism as the var. *nigricans* of *C. eglatina*, but without a tendency to rostration.

C. TIGRIS var. **ROSSITERI**. Is characterized by the dorsal surface being a beautiful orange, the scattered brown spots being few in numbers.

C. VITELLUS var. **SUBROSTRATA**. Based on a specimen showing a tendency to rostration.

C. ERRONES L. Under this species three varieties are recognized, var. *orum* Gmel. = *sophiae* Brazier, a color var. *albida*, entirely white except for light spots of brown on each side of the extremities, var. *pallidior*, with dorsum very pale, base recurved, callus very thick, white, without spots at the extremities.

C. WALKERI var. **ROSSITERI** is based on *Luponia bregeriana* Rossiter (1882) not Crosse (1868).

C. ZICZAC var. **DECOLORATA**. Specimens tending to albinism. *C. miliaris* Gmel. and *C. eburna* Barnes are both considered varieties of *C. lamarcki*; but in uniting these forms why make *C. lamarcki* Gray 1824 the species and *C. miliaris* Gmel. 1790 a variety?

C. PORARIA var. **IN SIGNIS** is unusually shining or seemingly translucent, dorsal region orange, without spots, base beautifully tinged with violet.—C. W. J.

BIOMETRIKA, a new journal for the statistical study of biological problems (Cambridge, England) contains several papers on mollusks. In vol. 2, part 1 (Nov., 1902), Miss Abigail C. Dimon has studied at length the variation and correlation of *Nassa trivittata* and *obsoleta* from Cold Spring Harbor, Long Island. She discusses the influence of density and stillness of water on depauperization. Both species were found at that locality to be smaller than normal type, this being attributed to lack of density of the waters of Long Island Sound as compared with the open ocean. While this explanation may apply to *N. trivittata* which is a snail inhabiting open beaches, it is certain that the small size of *N. obsoleta* is not thus to be explained, because this is a species of the salt meadows and inlets, and the largest individuals we have ever collected were taken in a stream in a mud-flat, which ran fresh at low tide, and being far from the open ocean, could not have been very dense when submerged at high tide. There is great need for improved mechanical devices for rapidly determining quantitatively the various characters both of form and

color in shells. We do not see much use in carrying the decimals of mm. to two or more places in measuring the length of shells of the size of these, but then it does no great harm if the measurer has plenty of time. There is a wide field for this kind of work among our mollusks, and the data to be obtained are of great value.—H. A. P.

Part 4 of Vol. I of the same journal contains a valuable statistical investigation by C. Hensgen on the band variations of *Helix nemoralis*, at several places in Strasburg. The paper is too extensive for abstract, but it may be mentioned that the curve for number of bands has its major mode at 0 with a well-marked minor mode at 3 bands. —H. A. P.

GENERAL NOTES.

CONUS PROMETHEUS Hwass.—A synonym of this species which I have not seen noticed in the monographs is *Conus nicholii* Wilson, 1831; figured in James Wilson's "Illustrations of Zoölogy," pl. 36. The specimen described measured $8\frac{1}{2}$ inches long.

In the revision of the CARDITACEA, lately printed by the Academy of Natural Sciences, I preserved the name *Miodon* for a form of *Venericardia* found on the Pacific coast and applied by Carpenter in 1864. For *Miodon* Sandberger, 1870, given to a fossil form of *Cyrena* the name *Miodontopsis* was proposed. In Sharp's Index Zoologicus just received, I find *Miodon* however was used for an ophidian in 1859 by Duméril, and therefore Carpenter's shell will have to have a new name also. In this case I would propose *Miodontiscus* for the Venericardian.—W. H. DALL.

Mr. Jas. H. Ferriss and the senior Editor of the NAUTILUS are collecting mollusks and ferns in the Southwest.

So many years have elapsed since a general work covering the entire mollusca has appeared, that it is of interest to many readers of THE NAUTILUS who have not access to the larger libraries to know what are the general views of leading biologists regarding the relative

position of the larger groups. This feature is very clearly shown in an excellent "Manual of Zoölogy," by Richard Hertwig, recently translated by Prof. J. S. Kingsley. "This American edition is not an exact translation. With the consent of the author, the whole text has been edited and modified in places to accord with American usage."

The Mollusca (Phylum VI) are divided into five classes, of which the *Amphineuru*, including two subclasses, *Placophora* (Chitons) and *Aplacophora* are considered the most primitive. Class II comprises *Acephala* or *Pelecypoda*, in which the views of Pelseneer are closely followed. The order *Protochonchia* includes most of the families grouped by Dr. Dall under *Prionodesmacea*, except the *Naiadæ*, which, with the remainder of the families, are placed in the order *Heteroconchia*. The *Nuculidae* are considered the most primitive, while the more highly specialized families, like the *Teredidæ* and *Gastrochænidæ*, are placed at the other extreme. *Scaphopoda* (Class III) are placed between the *Pelecypoda* and *Gasteropoda*; the latter being divided into three orders: *Prosobranchia*, *Opisthobranchia* and *Pulmonata*. The *Prosobranchs* are divided into two suborders: *Aspidobranchia*—of which the *Docoglossa* (Limpets) are the most primitive—and the *Pectinibranchia*. *Heteropoda* "in all details of gills, genitalia, heart and nervous system are true *Pectinibranchi*, but from an exclusively pelagic life have acquired peculiar modifications." The *Opisthobranchia* consists of three suborders: *Tectibranchia*, *Pteropoda*—"pelagic forms which in most points of structure agree with the *Tectibranchi*"—and *Nudibranchia*. Class V comprises the *Cephalopoda*.—C. W. J.

The junior editor of the *NAUTILUS* has been appointed Curator of the Boston Society of Natural History, Boston, Mass. This will be his future address.

ERRATA.—In the article "Notes on *Pyramidula elrodi* Pils." in the February *NAUTILUS*, McDonald Lake of the Mission Mountains should be read instead of Post Lake. There are two McDonald Lakes in Montana, and the authorities seem to think the same name for two lakes within a hundred miles of each other must stand.—M. J. ELROD.

CATALOGUE

OF

LAND SHELLS OF JAPAN

TO BE HAD OF

Y. HIRASE

1

SHIMOCHOJA-MACHI,
KARASUMARU, KYOTO, JAPAN.
1903.

HAVING collected Japanese land, fresh-water and marine shells for many years, the number of species in my possession has now reached several thousand. Among these are many new species, found by myself and my assistants. In the land shells especially, the new species outnumber those known before my researches began.

With the aid of numerous assistants I have been able to explore many parts of Japan, including the Riukiu (Loo-choo) Islands, and the Ogasawara (or Bonin) group, where a rich fauna of new and strange land shells was found. I hope in future to extend the work, and send collectors to China, Corea and Formosa.

All the species are sent to Dr. Pilsbry, of Philadelphia, U. S. A., who kindly determines them, so that I believe that those receiving specimens from me may place confidence in the names, and will find them an important and useful addition to their collections.

Attention is called to the importance of securing *authentic specimens from the original localities* of the many new species in my collections.

Catalogues of marine and fresh-water shells are in preparation.

Specimens will be sent on approval to purchasers known to me or giving satisfactory reference.

Y. HIRASE.

CATALOGUE
OF
LAND SHELLS,
TO BE HAD OF
Y. HIRASE,
SHIMOCHOJA-MACHI, KARASUMARU, KYOTO, JAPAN.

NOTE.—Species and varieties marked thus * are new forms, described from specimens from my collection. Where no prices are given, specimens are not always in stock.

ACMELLA.

*853 vagans, Pils.	Hahajima, Ogasawara,	\$0.08-.12
*856 minima, Pils.	Hahajima, Ogasawara,	.07-.10

ALYCAEUS.

*831b biexcisus, Pils.	Suimura, Awa. (Shikoku),	.05-.08
*298 harimensis, Pils.	Kashima, Harima,	.05-.08
*996 harimensis, var. sadoensis, P. & H.	Aikawa, Sado,	
*476 hirasei, Pils.	Kyoto, Yamashiro,	.04-.07
*499 melanopoma, Pils.	Mikuriya, Suruga,	.04-.07
*298b reinhardtii, Pils.	Kashima, Harima,	.05-.08
*704 satsumanus, Pils.	Kagoshima, Satsuma.	
*723 tanegashimæ, Pils.	Tanegashima, Osumi.	
*916 vincutus, Pils.	Tanegashima, Osumi.	

AURICULA.

442 reiniana, Kob.	Hirado, Hizen,	.07 ¹ -.12
	(5)	

BIFIDARIA.

619	armigerella, Reinh.	Yaeyama, Loochoo,	.05-.08
*798	ogasawarana, Pils.	Chichijima, Ogasawara.	
*797	chichijimana, Pils.	Chichijima, Ogasawara.	
757	plicidens, Benson.	Riozen, Omi.	

BLANFORDIA.

412	bensonii, A. Ad.	Shikunobe, Ojima,	.03-.05
*406	simplex, Pils.	Nishigo, Uzen,	.03-.05
990	japonica, A. Ad.	Sotokaifu, Sado.	

BULIMINOPSIS.

621	meiacoshimensis, A. Ad. & Rve.	Yaeyama, Loochoo,	.07-.12
*455	turrita, Gude.	Loochoo,	.05-.08

BULIMINUS.

311	andersonianus, Mlldff.	Shikunobe, Ojima,	.06-.10
*750a	andersonianus, var. echigoensis, P. & H.	Myokozan, Echigo.	
*468	callistoderma, Pils.	Hahajima, Ogasawara,	.05-.08
*758	callistoderma, var. hachijoensis, Pils.	Hachijo, Izu.	
*602	callistoderma, var. [‡] ogasawaræ, Pils.	Hahajima, Ogasawara,	.08-.15
*597	eucharistus, Pils.	Yaeyama, Loochoo.	
*478	hirasei, Pils.	Kikai, Osumi,	.08-.12
919	hiraseanus, Pils.	Hahajima, Ogasawara.	
*598	luchuanus, Pils.	Yaeyama, Loochoo.	
*930	luchuanus, var. oshimanus, Pils.	Oshima, Osumi.	
509	reinianus, Kob. v.	Shirakata, Sanuki.	
582	reinianus, Kob.	Arakura, Tosa,	.08-.12
587	reinianus, Kob. (small var.)	Okinoshima, Tosa.	
549	reinianus, var. extorris, Branc.	Kyoto, Yamashiro,	.06-.10

*411	reinianus, var. hokkaidoensis, Pils.	Shikunobe, Ojima,	.12-.20
*484	reinianus, var. omiensis, Pils.	Ibuki, Omi,	.08-.12

CARYCHIUM.

*618	cymatoplax, Pils.	Yaeyama, Loochoo,	.05-.08
*946	hachijoensis, Pils.	Hachijojhma, Iza.	
555	noduliferum, Reinh.	Nishigo, Uzen,	.04-.07
*729	pessimum, Pils.	Tanegashima, Osumi,	.06-.10

CASSIDULA.

445	labrella, Desh.	Hirado, Hizen,	.03-.05
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CHLORITIS.

*958	albolabris, Pils. & Hir.	Yakushima, Osumi.	
*354	eucharistus, Pils.	Oshima, Osumi,	.25-.40
*981	echizenensis, Pils. & Hir.	Omushi, Echizen.	
*13	fragilis, Gude.	Kyoto, Yamashiro.	
*786	hirasei, Pils.	Kurozu, Kii.	
*843b	perpunctatus, Pils.	Totsugawa, Yamato.	
*735	pumila, Gude.	Mikuriya, Suruga.	

CLAUSILIA.

424	addisoni, Pils.	Kagoshima, Satsuma,	.05-.08
*663c	agna, Pils.	Yakushima, Osumi.	
*1014	aenea, Pils.	Tosa.	
501	attrita, Bttg.	Ibuki, Omi,	.05-.08
*764b	attrita, var. in- fausta, Pils.	Tomisato, Kii,	.07-.10
*1013	aratorum, Pils.	Tosa.	
*450b	aulacophora, Pils.	Fukura, Awaji,	.05-.08
*733b	aulacopoma, Pils.	Hirado, Hizen,	.06-.10
503	aurantiaca, Bttg.	Nohara, Yamato,	.05-.08
738	aurantiaca, var. erberi, Bttg.	Gojo, Yamato,	.05-.08
782	aurantiaca, var. plicidens, A. Ad.	Kashima, Kii,	.05-.08

*450a	awajiensis, Pils.	Fukura, Awaji,	.05-.08
*818	bigeneris, Pils.	Goto, Hizen.	
254	bilabrata, Smith.	Senzan, Awaji.	
*1002	bilabrata, var. tosaensis, Pils.	Shiujomura, Tosa.	
593	brevior, Mart.	Oshima, Izu,	.05-.08
*634	callistochila, Pils.	Kunchan, Loochoo.	
*894	caloptyx, Pils.	Yakushima, Osumi.	
*770c	caryostoma, var. jayi, Pils.	Jomura, Kii.	
434c	caryostoma, Mlldff.	Banzai, Awa.	
*306b	comes, Pils.	Kashima, Harima,	.06-.10
*632a	crenilabium, Pils.	Kunchan, Loochoo,	.08-.12
*632b	crenilabium, Pils. (var.)	Kunchan, Loochoo.	
*874	daemonorum, Pils.	Kikai, Osumi.	
*819	dalli, Pils.	Tairiuji, Awa (Shikoku),	.07-.10
410a	digonoptyx, Bttg.	Nishigo, Uzen,	.05-.08
739a	ducalis, Kob.	Miyamura, Hida,	.10-.15
*913a	ducalis, var. decapitata, Pils.	Kashima, Harima.	
740	ducalis, var. dorcas, Pils.	Miyamura, Hida,	.10-.15
*765b	ducalis, var. mediocris, Pils.	Tomisato, Kii.	
*986	echigoensis, Pils.	Myokozan, Echigo.	
*663a	entospira, Pils.	Tanegashima, Osumi.	
*563	euholostoma, Pils.	Mikuriya, Suruga,	.07-.10
687	fultoni, Sykes.	Ushirogawa, Tosa.	
*794	graciæ, Pils.	Nachi, Kii,	.07-.10
592	hakonensis, Pils.	Oshima, Izu.	
*306a	harimensis, Pils.	Kashima, Harima,	.06-.10
*764a	heteroptyx, Pils.	Tomisato, Kii.	
*423	hirasei, Pils.	Kagoshima, Satsuma,	.04-.07
*586	hiraseana, Pils.	Okinoshima, Tosa,	.06-.10
*546b	hokkaidensis, Pils.	Kayabe, Ojima.	
*789	holotrema, Pils.	Nachi, Kii.	
686	hyperolia, Mart.	Oshima, Izu,	.06-.10

*457	hyperoptyx, Pils.	Loochoo,	.05-.07
*733	subignobilis, Pils.	Hirado, Hizen,	.05-.07
*486b	iotaptyx, Pils.	Ibuki, Omi,	.08-.12
*292	iotaptyx, var. clava, Pils.	Senzan, Awaji,	.05-.08
*657a	isehna, Pils.	Kioragi, Higo,	.06-.10
*754	jacobiana, Pils. 56a japonica, Crosse.	Tanegashima, Osumi, Senzan, Awaji,	.05-.08 .04-.06
198	japonica, Crosse. (large var.)	Takeya, Izumo,	.04-.06
*403	japonica, var. inter- plicata, Pils.	Nishigo, Uzen,	.05-.07
11	japonica, var. nipponeensis, Kob.	Kyoto, Yamashiro,	.03-.05
*56e	japonica, var. per- obscura, Pils.	Shirono, Buzen,	.08-.12
*657b	kochiensis, Pils.	Kioragi, Higo,	.08-.12
*934	kurozuensis, Pils. 564 martensi, Herklots.	Kurozu, Kii. Mikuriya, Suruga,	.07-.10
500	marteñsi, var. reiniana, Kob.	Ibuki, Omi,	.07-.10
*768	martensi, var. tinctilabris, Pils.	Nachi, Kii.	.08-.12
737	micropeas, Mlldff. (var.)	Mikuriya, Suruga,	.05-.08
*486a	mikado, Pils.	Ibuki, Omi,	.05-.08
*654	mima, Pils.	Oshima, Osumi.	
*762	mitsukurii, Pils.	Tomisato, Kii,	.10-.15
*546a	monelasmus, Pils.	Kayabe, Ojima,	.05-.08
*646	munus, Pils.	Oshima, Osumi,	.06-.10
*932	neniopsis, Pils.	Oshima, Osumi.	
*652	nesiothauma, Pils.	Oshima, Osumi,	.10-.15
*434	nolani, Pils. 463 oostoma, Mlldff.	Fukura, Awaji, Mikuriya, Suruga,	.07-.12 .04-.06
*926	oostoma, var. goniopoma, Pils.	Wakayama, Kii.	
*696	oostoma, var. dactylopoma, Pils.	Kashio, Awaji.	

*748	orthattracta, Pils.	Akasaka, Mino.	
*674	oscariana, Pils.	Fukuregi, Higo,	.08-.15
*653a	oshimæ, Pils.	Oshima, Osumi.	
*695	oxycyma, Pils.	Kagoshima, Satsuma.	
*954	pachyspira, Pils.	Miyai, Kii.	
*584	perignobilis, Pils.	Okinoshima, Tosa,	.06-.10
*410b	perpallida, Pils.	Nishigo, Uzen,	.08-.12
*306c	pigra, Pils.	Kashima, Harima,	.06-.10
*663b	pinto, Pils.	Tanegashima, Osumi,	.06-.10
*817	plagiptyx, Pils.	Goto, Hizen.	
473	platyauchen, Mart. (var.)	Nishigo, Uzen,	.05-.08
669	platyauchen, Mart. (small var.)	Mikuriya, Suruga,	.04-.07
502	platydera, var. lambda, Bttg.	Nohara, Yamato,	.05-.08
*763	platydera, var. kiiensis, Pils.	Tomisato, Kii,	.06-.10
*434d	platyderula, Pils.	Aki, Awa.	
*653b	pseudoshimæ, Pils.	Oshima, Osumi.	
*664a	ptychocyma, Pils.	Tanegashima, Osumi,	.08-.12
*664b	ptychocyma, var. yakushimæ, Pils.	Yakushima, Osumi,	.07-.10
*993	sadoensis, Pils.	Misakimura, Sado.	
656	schmackeri, Sykes.	Kochi, Tosa,	.07-.10
987	sericina, Mlldff.	Omimura, Echigo.	
*736b	sericina, var. rhopalia, Pils.	Mikuriya, Suruga,	.08-.15
*506	shikokuensis, Pils.	Ushirogawa, Tosa,	.07-.10
*820	shikokuensis, Pils. (small var.)	Tairiuji, Awa (Shikoku),	.05-.07
*506c	shikokuensis, var. inokuchiensis, Pils.	Inokuchimura, Tosa.	
*345	sieboldi, var. diptyx, Pils.	Hirado, Hizen,	.04-.06
622	stearnsii, Pils.	Yaeyama, Loochoo,	.08-.12
*594	stearnsii, Pils. (small var.)	Loochoo.	

*670	stereoma, Pils.	Yakushima, Osumi,	.08-.12
*661	stereoma, var. cognata, Pils.	Tanegashima, Osumi,	.06-.10
*670a	stereoma, var. hexaptyx, Pils.	Yakushima, Osumi.	
*671	stereoma, var. nugax.	Yakushima, Osumi.	
*505	subaurantiaca, Pils.	Toyonishikami, Nagato,	.06-.10
*488	subjaponica, Pils.	Ibuki, Omi,	.05-.08
*766	subulina, var. leucopeas, Pils.	Tomisato, Kii.	
*688	surugensis, Pils.	Mikuriya, Suruga,	.06-.10
*1007	sus, Pils.	Muya, Awa.	
*662	tanegashimæ, Pils.	Tanegashima, Osumi,	.08-.12
*813	tantilla, Pils. 8 tau, Bttg.	Goto, Hizen, Kyoto, Yamashiro,	.08-.12 .01-.02
*550	tosana, Pils.	Ushirogawa, Tosa,	.07-.12
*638b	tryoni, Pils.	Hachijo, Izu,	.08-.12
*816	una, Pils. 462 valida, var. fasciata, Sykes.	Goto, Hizen. Miyako, Loochoo,	.08-.12 .04-.06
*633	valida, var. perfasciata, Pils.	Kunchan, Loochoo,	.05-.08
732	(Reinia) variegata, A. Ad.	Hirado, Hizen,	.04-.07
*942	(Reinia) variegata, yar. nakadai, Pils.	Hachijojima, Izu.	
675	vasta, Bttg.	Fukuregi, Higo.	

“CRYSTALLUS.”

* . . .	velatus, Gude.	Kyoto, Yamashiro.
* . . .	sulcatus, Gude.	Kyoto, Yamashiro.

COCHLICOPA.

362	lubrica, Müll.	Shikunobe, Ojima,	.05-.07
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CYCLOPHORUS.

2	herklotzi, Mart.	Kyoto, Yamashiro,	.02-.04
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*421	herklotsi, var.		
	expallescens, Ehrm.	Kagoshima, Satsuma,	.05-.07
*644	hirasei, Pils.	Oshima, Osumi.	
*574	kikaiensis, Pils.	Kikai, Osumi,	.06-.10
*684b	kikaiensis, Pils.	Kikai, Osumi, (fossil.)	.10-.15
372	turgidus, Pfr.	Loochoo,	.03-.05
684a	turgidus, Pfr.		
	(fossil, large var.)	Kikai, Osumi,	.10-.15
*713	turgidus, var.		
	angulatus, Pils.	Loochoo,	.12-.20

CYCLOTUS.

54	campanulatus, Mart.	Senzan, Awaji,	.04-.06
*612	hirasei, Pils.	Loochoo,	.06-.10
*307	micon, Pils.	Kashima, Harima,	.03-.05

DIPLOMMA TINA.

*604	cassa, Pils.	Kodakari, Hida,	.04-.07
512	collarifera, S. & B.	Ibuki, Omi,	.04-.07
*870	dormitor, Pils.	Kikaigashima, Osumi.	
*620	insularum, Pils.	Yaeyama, Loochoo,	.05-.08
*822	kiensis, Pils.	Tairuji, Awa (Shikoku),	.05-.08
*305b	kobelti, Ehrm.	Kashima, Harima,	.04-.06
*812	kobelti, var.		
	ampla, Pils.	Goto, Hizen,	.05-.08
*629	lachuana, Pils.	Kunchan, Loochoo.	
305a	nipponensis, Mlldff.	Kashima, Harima,	.04-.06
*647	oshimæ, Pils.	Oshima, Osumi.	
*836a	pudica, Pils.	Nachi, Kii,	.06-.08
521	pusilla, Mart.	Kashima, Harima,	.04-.07
*487	pusilla, var.		
	omiensis, Pils.	Ibuki, Omi,	.04-.07
*649	saginata, Pils.	Oshima, Osumi,	.06-.10
*639	septentrionalis, Pils.	Kayabe, Ojima,	.05-.08
*668	tanegashimæ, Pils.	Tanegashima, Osumi,	.06-.10
*296	tenuiplica, Pils.	Kashima, Harima,	.04-.06
*648	turris, Pils.	Oshima, Osumi,	.06-.10
*510	uzenensis, Pils.	Nishigo, Uzen,	.05-.08
*679	yakushimæ, Pils.	Yakushima, Osumi,	.06-.10

ENNEA.

*295	iwakawa, Pils.	Kashima, Harima,	.04-.06
*680	iwakawa, var. yakushima, Pils.	Yakushima, Osumi,	.05-.08

EULOTA (AEGISTA).

*451	aperta, Pils.	Fukura, Awaji,	.07-.12
*761	aperta, var. cavata, Pils.	Tomisato, Kii,	.08-.12
*787	aperta, var. trachyderma, Pils.	Ikoma, Kii.	
*937	aperta, var. mikuriyensis, Pils.	Mikuriya, Suruga.	
343	friedeliana, Mart.	Hirado, Hizen,	.04-.07
*960	intonsa, Pils. & Hir.	Suimura, Awa.	
288	kobensis, S. & B.	Kyoto, Yamashiro,	.10-.15
*969	kobensis, var. gotoensis, P. & H. Goto,	Hizen.	
*353	martensiana, Pils.	Sedake, Osumi,	.15-.25
*929	minima, Pils.	Oshima, Osumi.	
*590	mimula, Pils.	Kayabe, Ojima,	.08-.12
*753	mimuloides, Gude.	Itanami, Omi.	
475	oculus, Pfr.	Loochoo,	.08-.12
998	subchinensis, Nev.	Loochoo.	
272	vermis, Rve.	Loochoo,	.20-.30

EULOTA (COELORUS).

*9	cavicollis, Pils.	Kyoto, Yamashiro,	.06-.10
*815	caviconus, Pils.	Goto, Hizen.	

EULOTA (EUHADRA).

359	blakeana, Newc. var. blakei, Kob.	Shikunobe, Ojima,	.10-.15
528	blakeana, var. sericea, Gude.	Nobusayama, Teshiwo.	
271	caliginosa, Ad. & R.	Yaeyama, Loochoo,	.08-.12
224	callizona, var. amaliae, Kob.	Tadachi, Shinano,	.05-.08

82	callizona, var.		
	congenita, Smith.	Kobe, Settsu.	
*87	callizona, var.		
	dixoni, Pils.	Inga, Hoki,	.12-.20
399	callizona, var.		
	maritima, P. & G.	Hagi, Nagato,	.05-.08
*239	callizona, var.		
	minor, Gude.	Hagi, Nagato,	.06-.10
393	connivens, Pfr.	Itoman, Loochoo,	.04-.06
472	connivens, var.		
	phaeogramma, Anc.	Kikai, Osumi,	.05-.08
*556	grata, Gude.	Nishigo, Uzen,	.30-.50
73	luhuana, Sowb.	Hirado, Hizen,	.04-.07
*547	luhuana, var.		
	aomoriensis, G., P.	Chojamura, Mutsu,	.08-.15
*186b	luhuana, var.		
	arimensis, G., P.	Tadachi, Shinano.	
248	luhuana, var.		
	eoae, Crosse.	Mikuriya, Suruga,	.10-.15
199	luhuana, var.		
	idzumonis, P. & G.	Takeya, Idzumo.	
*78b	luhuana, var.		
	nesiotica, Pils.	Tanegashima, Osumi.	
*682	luhuana, var.		
	pachya, Pils.	Kikai, Osumi, (fossil)	.15-.20
19	luhuana, var.		
	tsushimana, Mlldff.	Izuhara, Tsushima,	.04-.07
*116	luna, Pils.	Iwamizawa, Ishikari.	
371	mercatoria, Gray.	Loochoo,	.05-.08
496	mercatoria, var.		
	atrata, Pils.	Kunchan, Loochoo,	.10-.30
*683	mercatoria, var.		
	dæmonorum, Pils.	Kikai, Osumi, (fossil.)	.15-.20
*357	oshimæ, Pils.	Oshima, Osumi,	.15-.30
281	peliomphala, Pfr.	Gomei, Kai,	.05-.08
319	peliomphala, Pfr.		
	(large var.)	Kyoto, Yamashiro,	.08-.15
560	peliomphala, var.		
	brandtii, Kob.	Manabe, Hitachi,	.07-.10

90	peliomphala, var. herklotsi, Mart.	Kyoto, Yamashiro,	.04-.06
139	peliomphala, var. nimbosa, Crosse.	Toyado, Shimotsuke.	
*358	peliomphala, var. sep- tentriionalis, Ehrm.	Shikunobe, Ojima,	.06-.10
402	quaesita, Desh.	Nishigo, Uzen,	.05-.08
*994	sadoensis, Pils. & Hir.	Sotokaifumura, Sado.	
225	scaevara, Mart.	Ibuki, Omi,	.20-.30
186a	senckenbergiana, K.	Kokubu, Hida,	.15-.25
199	senckenbergiana, Kob. (var.)	Takeya, Izumo,	.08-.15
*828	senckenbergiana, var. awaensis, Pils.	Suimura, Awa (Shikoku),	.20-.30
*660	submandarina, Pils.	Tanegashima, Osumi,	.12-.20
*835a	submandarina, Pils.	Kikai, Osumi, (fossil.)	.15-.25
*777	submandarina, var. compacta, Pils.	Yakushima, Osumi,	.25-.35
*672	submandarina, var. magna, Pils.	Yakushima, Osumi.	
291	yaeyamensis, Pils.	Loochoo,	.40-.60

EULOTA (EULOTELLA).

4	similaris, Fer.	Kyoto, Yamashiro,	.02-.04
545	commoda, A. Ad.	Kayabe, Ojima,	.06-.10

EULOTA (PLECTOTROPIS).

*431	aemula, Gude.	Takeya, Izumo,	.06-.10
*774	deflexa, Pils.	Tobishima, Ugo,	.12-.20
396	elegantissima, Pfr.	Naha, Loochoo,	.05-.08
*536	elegantissima, var. cara, Pils.	Kunchan, Loochoo,	.07-.12
*943	hachijoensis, Pils.	Hachijo-jima, Izu.	
*407	horrida, Pils.	Nishigo, Uzen,	.12-.20
*596	inornata, Pils.	Yaeyama, Loochoo,	.15-.35
*479	kiusiuensis, Pils.	Kikai, Osumi,	.15-.25
*914	kiusiuensis, var. oshimana, P. & H.	Oshima, Osumi.	

*464	lepidophora, Gude.	Loochoo,	.04-.07
273	mackensii, A. Ad. & Rve.	Yaeyama, Loochoo,	.10-.15
*752	omiensis, Pils.	Itanami, Omi,	.15-.25
*752a	omiensis, var. echizenensis, Pils.	Arato, Echizen.	
*773	pannosa, Pils.	Atsumi, Uzen,	.12-.20
461	scepsasma, Pfr.	Loochoo,	.06-.10
*694	shikokuensis, Pils.	Yoshida, Iyo.	
110	trochula, A. Ad.	Izuhara, Tsushima,	.05-.08
10a	vulgivaga, S. & B.	Kyoto, Yamashiro,	.05-.08
10b	vulgivaga, S. & B. var.	Ibuki, Omi,	.05-.08
*825	vulgivaga, var. lanx, Pils.	Suimura, Awa (Shikoku),	.10-.15

EULOTA (ACUSTA).

394	despecta, Gray.	Naha, Loochoo,	.04-.07
459	despecta, Gray. (large var.)	Loochoo.	
685	despecta, Gray. (large var., fossil.)	Kikai, Osumi.	
*474a	despecta, var. kikaiensis, Pils.	Kikai, Osumi.	
*249	gainesi, Pils.	Ushika, Teshiwo,	.10-.15
216	gainesi, var. gudeana, Pils.	Kiyokawa, Ojima,	.06-.10
409	sieboldiana, Pfr.	Nishigo, Uzen,	.03-.05
*14	sieboldiana, var. minor, Gude.	Kyoto, Yamashiro.	

GANESELLA.

*352	adelinæ, Pils.	Oshima, Osumi,	.25-.40
*783b	cristata, Pils.	Nachi, Kii.	
*975	cardiostoma, var. kagaensis, P. & H.	Hakusan, Kaga.	
*734	fausta, Pils.	Mikuriya, Suruga.	
*508	ferruginea, Pils.	Ushirogawa, Tosa,	.10-.15
*309	jacobii, Pils.	Ibuki, Omi,	.15-.25
12	japonica, Pfr.	Kyoto, Yamashiro,	.07-.12

*513a	japonica, var. cari-		
	nata, Pils. & Gul.	Ibuki, Omi,	.10-.15
*548a	japonica, var.		
	granulosa, Pils.	Kyoto, Yamashiro,	.07-.12
*252	japonica, var.		
	heteroglypta, Pils.	Fukura, Awaji,	.10-.15
106	japonica, var.		
	satsuma, Pils.	Kamo, Shima.	
460	largillierti, var.		
	cineta, Pils.	Loochoo,	.08-.12
535	largillierti, var.		
	cosmia, Pils.	Shimaziri, Loochoo,	.08-.12
74	myomphala, Mart.	Hirado, Hizen,	.15-.25
328	myomphala, var.		
	fusca, Gude.	Kokubu, Hida,	.15-.25
96	myomphala, var.		
	minor, Gude.	Toyonishikaini, Nagato,	.10-.15
*260	myomphala, var.		
	omphalodes, Pils.	Omkado, Inaba.	
*289c	notensis, Pils. & Hir.	Kitanosho, Noto.	
*824	optima, Pils.	Suimura, Awa (Shikoku).	
*61	pagodula, Ehrm.	Nohara, Yamato,	.12-.20
*788	selasia, Pils.	Nachi, Kii.	
*834	sororcula, Pils.	Kikai, Osumi (fossil).	
289	stearnsii, Pils.	Kyoto, Yamashiro,	.30-.40
*689a	tanegashimæ, Pils.	Tanegashima, Osumi.	
*689b	tanegashimæ, var.		
	dulcis, Pils.	Tanegashima, Osumi.	
*577	wiegmanniana, Pils.	Kochi, Tosa.	.10-.15

GEORISSA.

*471	japonica, Pils.	Kashima, Harima,	.04-.07
*623b	luchuana, Pils.	Yaeyama, Loochoo.	

HIRASEA.

*897	acuta, Pils.	Imotoshima, Ogasawara.	
*848	acutissima, Pils.	Hahajima, Ogasawara.	
*849	biconcava, Pils.	Hahajima, Ogasawara.	.10-.15

*800	chichijimana, Pils.	Chichijima, Ogasawara.	
*863	diplomphalus, Pils.	Chichijima, Ogasawara.	
*847	eutheca, Pils.	Hahajima, Ogasawara.	
*864	goniobasis, Pils.	Chichijima, Ogasawara.	
*850	hypolia, Pils.	Hahajima, Ogasawara,	.08-.15
*865	major, Pils.	Chichijima, Ogasawara.	
*854	(Fametesta)mirabilis, Pils.	Hahajima, Ogasawara.	
*801	nesiotica, Pils.	Hahajima, Ogasawara,	.10-.15
*863c	profundispira, Pils.	Chichijima, Ogasawara.	
*802	sinuosa, Pils.	Hahajima, Ogasawara,	.10-.15

HIRASIENNA.

*867	clara, Pils.	Chichijima, Ogasawara.
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HELICINA.

*806	capsula, Pils.	Hahajima, Ogasawara.	
595	hakodadiensis, Hartm.	Kayabe, Ojima,	.05-.08
*852	hirasei, Pils.	Hahajima, Ogasawara,	.10-.15
759	japonica, A. Ad.	Tobishima, Ugo (type loc.),	.08-.12
*575	japonica, var. uzenensis, Pils.	Nishigo, Uzen,	.06-.10
*808	ogasawarana, Pils.	Hahajima, Ogasawara,	.10-.15
*809	ogasawarana, var. discrepans, Pils.	Chichijima, Ogasawara.	
*862	ogasawarana, var. optima, Pils.	Chichijima, Ogasawara.	
*558	osumiensis, Pils.	Kikai, Osumi,	.05-.08
308	reinii, Kob.	Ibuki, Omi,	.04-.06
*55	reinii, var. expolita, Pils.	Senzan, Awaji,	.03-.05
*991	sadoensis, Pils. & Hir.	Sotokaifa, Sado.	
470	verecunda, Gld.	Loochoo,	.04-.07
*624	yaeyamensis, Pils.	Yaeyama, Loochoo,	.04-.07
*807b	yoshiwarana, Pils.	Hahajima, Ogasawara.	
*807a	yoshiwarana, var. arata, Pils.	Hahajima, Ogasawara.	

*857	yoshiwarana, var. microtheca, Pils.	Hahajima, Ogasawara,	.08-.12
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KALIELLA.

448	acutangula, A. Ad.	Kyoto, Yamashiro,	.05-.08
*627	austeniana, Pils.	Yaeyama, Loochoo.	
*641	borealis, Pils.	Kayabe, Ojima.	
*482	ceratodes, Gude.	Kashima, Harima.	
*518	circumcincta, Reinh., var. elata, Gude.	Kashima, Harima.	
*609	crenulata, Gude.	Kochi, Tosa.	
*519	fraterna, Pils.	Kashima, Harima.	
*678	gudei, Pils. & Hir.	Kayabe, Ojima.	
*655	harimensis, Pils.	Kashima, Ojima,	.06-.10
*971	kagaensis, Pils. & Hir.	Hakusan, Kaga.	
*697	kyotoensis, Pils.	Kyoto, Yamashiro,	.05-08
*678	gudei, Pils. & Hir.	Kayabe, Ojima,	.08-.12
* . .	lioderma, Pils.	Kashima, Harima.	
*941	hachijoensis, Pils.	Hachijo-jima, Izu.	
*892	hizenensis, Pils.	Hirado, Hizen.	
*720	modesta, Pils;	Oshima, Higo.	
*300	multivolvis, Pils.	Kashima, Harima,	.05-.08
*466	nahaensis, Gude.	Loochoo,	.04-.07
*625b	nahaensis, var. kunchana, Pils.	Kunchan, Loochoo.	
*490	nanodes, Gude.	Kyoto, Yamashiro.	
*846	ogasawarana, Pils.	Hahajima, Ogasawara,	.10-.15
*891	okiana, Pils.	Hirado, Hizen.	
*514	pagoduloides, Gude.	Kashima, Harima.	
*952	pallida, Pils.	Hachijo-jima, Izu.	
*743	praealta, Pils.	Ryozen, Omi.	
*302	reinhardtii, Pils.	Kashima, Harima,	.05-.07
*607	ruida, Pils.	Gojo, Yamato.	
* . .	subcrenulata, Pils.	Kochi, Tosa.	
*625a	yaeyamensis, Pils.	Yaeyama, Loochoo,	.06-.10
*606a	yamatoensis, Pils.	Gojo, Yamato,	.06-.10

LEPTOPOMA.

275	vitreum, Less.	Yaeyama, Loochoo,	.05-.08
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MACROCHLAMYS.

*838	cerasina, Pils.	Tobishima, Ugo,	.08-.15
*821	cerasina, var. awaensis, Pils.	Tairiuji, Awa (Shikoku), Kyoto, Yamashiro,	.08-.12 .06-.08
*785	duleis, Pils.	Nachi, Kii.	
*465	fulgens, Gude.	Loochoo,	.05-.08
*635	gudei, Pils.	Kunchan, Loochoo.	
*974	kagaensis, Pils.	Hakusan, Kaga.	
*282	micrograpta, Pils.	Kashima, Harima.	
*637	perfragilis, Pils.	Kunchan, Loochoo.	
*1000	perfragilis, var. shikokuensis, Pils.	Kotsuzan, Awa.	
935a	semisericata, Pils.	Kurozu, Kii.	
*666	tanegashimæ, Pils.	Tanegashima, Osumi,	.06-.12

MANDARINA.

*805	exoptata, Pils.	Hahajima, Ogasawara,	.25-.40
*845	exoptata, var. obtusa, Pils.	Hahajima, Ogasawara.	
*860	hirasei, Pils.	Chichijima, Ogasawara.	
467a	mandarina, Gray.	Hahajima, Ogasawara,	.10-.15
*858	mandarina, var. hahajimana, Pils.	Hahajima, Ogasawara,	.25-.40
*467b	mandarina, var. ponderosa, Pils.	Hahajima, Ogasawara,	.15-.25
*896	mandarina, var. conus, Pils.	Imotoshima, Ogasawara.	
906	ruschenbergeriana, Pils.	Chichijima, Ogasawara.	
859	pallasiana, Pfr.	Chichijima, Ogasawara.	

MELAMPUS.

446	caffer, Krauss.	Hirado, Hizen,	.03-.05
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MICROCYSTINA.

*949	circumdata, Pils.	Hachijojima, Izu.	
*482	ceratodes, Gude.	Kashima, Harima.	
*667	hiraseana, Pils.	Tanegashima, Osumi.	.06-.12
*803	bahajimana, Pils.	Hahajima, Ogasawara,	.08-.12
*973	nuda, Pils.	Hakusan, Kaga.	
483	sinapidium, Reinh.	Kashima, Harima,	.06-.10
*900	yakuensis, Pils.	Yakushima, Osumi.	
*1002	higashiyamana, Pils. & Hir.,	Higashiyama, Awa.	

NESOPUPA.

*855	dedecora, Pils.	Hahajima, Ogasawara,	.08-.12
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OMPHALOTROPIS.

*588	japonica, Pils.	Kashiwashima, Tosa.	.05-.08
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OPEAS.

*286a	brevispira, Pils.	Kashima, Harima,	.08-.12
456a	gracilis, Hutt.	Loochoo,	.05-.07
*286b	kashimæ, Pils.	Kashima, Harima,	.04-.07
*313b	kyotoensis, Pils.	Kyoto, Yamashiro,	.04-.07
*456b	obesispira, Pils.	Loochoo,	.05-.07
313a	pyrgula, A. Ad.	Kyoto, Yamashiro,	.04-.07

OTESIA.

673	japonica, Mlldff.	Kagoshima, Satsuma.	
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PUNCTUM.

*553	amblygonum, var. pretiosum, Gude.	Fukura, Awaji,	.04-.07
*517	japonicum, Pils.	Kashima, Harima.	
*553b	morseanum, Pils.	Hirado, Hizen.	

PUPINELLA.

*665a	funatoi, Pils.	Tanegashima, Osumi,	.06-.10
*645	oshimæ, Pils.	Oshima, Osumi,	.06-.10
51	rufa, Sowb.	Senzan, Awaji,	.03-.05
*731b	rufa, var. alba, Pils.	Hirado, Hizen,	.06-.10

*665b *rufa*, var. *tane-*

gashima, Pils. Tanegashima, Osumi, .04-.07

PUPISOMA.

*972 *edentulum*, Drap. Hakusan, Kaga.

PYRAMIDULA.

*961 *conica*, Pils. Suimura, Awa.405 *pauper*, Gld. Nishigo, Uzen, .02-.03529 *pauper*, var. *depressa*, A. Ad. Nobusayama, Teshiwo, .05-.07*950 *pauper*, var. *hachijoensis*, Pils. Hachijo-jima, Izu.

PYTHIA.

*710b *aegialites*, Pils. Loochoo.444 *œcillei*, Phil. Hirado, Hizen, .05-.08*709 *pachyodon*, Pils. Loochoo.453 *Pythia* sp. Loochoo, .04-.06

SITALA.

*717 *circumcineta*, var. *elata*, Gude. Takayama, Iyo, .05-.08*953 *latissima*, Pils. Yaeyama.

SPIROPOMA (FORMERLY COELOPOMA).

53 *japonicum*, A. Ad. Senzan, Awaji, .03-.05*658 *nakadai*, Pils. Tanegashima, Osumi, .06-.10

SPHYRADIUM.

972 *edentulum*, Drap. Hakusan, Kaga; Kiyotaki, Omi.

SUCCINEA.

*642 *hirasei*, Pils. Tsuchiura, Hitachi, .05-.08312 *horticola*, Reinh. Kyoto, Yamashiro, .04-.07408 *lauta*, Gld. Nishigo, Uzen, .03-.05*617a *ogasawaræ*, Pils. Hahajima, Ogasawara, .06-.08*617b *punctulispira*, Pils. Hahajima, Ogasawara.

TORNATELLINA.

*948	biplicata, Pils.	Hachijojima, Izu.	
*626	inexpectata, Pils.	Yaeyama, Loochoo,	.05-.08
*799	ogasawara, Pils.	Chichijima, Ogasawara.	
*851	tryoni, Pils.	Hahajima, Ogasawara.	

TRISHOPLITA.

*600	collinsoni, var.		
	casta, Pils.	Obi, Hiuga.	
*691	collinsoni, var.		
	okinoshimæ, Pils.	Okinoshima, Tosa.	
*565	cretacea, Gude.	Ushirogawa, Tosa,	.12-.20
*566	cretacea, var.		
	bipartita, Pils.	Toyonishikami, Nagato,	.10-.15
*507	dacostæ, Gude.	Kagoshima, Satsuma.	
*344	dacostæ, var.		
	strigata, Pils.	Hirado, Hizen,	.06-.10
*643	dacostæ, var.		
	awajiensis, Pils.	Anaga, Awaji,	.06-.10
7	goodwini, Smith.	Kyoto, Yamashiro,	.05-.08
*5	goodwini, var.		
	kyotoensis, Pils.	Kyoto, Yamashiro,	.06-.10
310	hilgendorfii, Kob.	Ibuki, Omi,	.05-.08
*746	hilgendorfii, var.		
	chikubushimaæ, Pils.	Chikubushima, Omi.	
*751a	hilgendorfii, var.		
	tenuis, Pils.	Ibuki, Omi,	.06-.10
*303	hilgendorfii, var.		
	rufa, Pils.	Kashima, Harima.	
*601	hiugensis, Pils.	Obi, Hinga.	
580	mesogonia, Pils.		
	(var.)	Kochi, Tosa,	.06-.10
581a	pallens, Ehrm.	Arakura, Tosa,	.10-.15
*387	pura, Ehrm.	Inga, Hoki.	
*581b	smithiana, Pils.	Arakura, Tosa,	.10-.15
*389	tosana, Gude.	Ushirogawa, Tosa,	.10-.15
*751b	tosana, var.		
	anozona, Pils.	Akasaka, Mino.	

TROCHOMORPHA.

*650	gouldiana, Pils.	Oshima, Osumi,	.06-.10
631	horiomphala, Pfr. (<i>fritzei</i> , Bttg.)	Kunchan, Loochoo.	

TRUNCATELLA.

*811c	kiusiuensis, Pils.	Tanegashima, Osumi,	.05-.08
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VERTIGO.

*570	hirasei, Pils.	Yanagawa, Chikugo.
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VALLONIA.

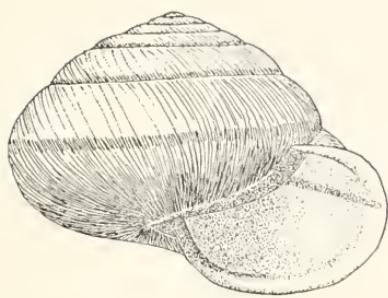
281	tenera, Reinh.	Osaka, Settsu.
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ZONITOIDES.

1005	arboreus, Say.	Tokyo.	
554	minusculus, Binn.	Fukura, Awaji,	.04-.07
*951	subarboreus, Pils.	Hachijojima, Izu.	

EXPLANATION OF PLATE.

Fig. 1. *Ganesella myomphala* Martens. Hirado, Hizen.
 Fig. 2. *Clausilia martensi* var. *reiniana* Kob. Ibuki, Omi.
 Fig. 3. *Eulota callizona* var. *dixoni* Pils. Takeya, Idzumo.
 Fig. 4. *Eulota senckenbergiana* var. *awaensis* Pils. Suimura, Awa.
 Figs. 5, 6. *Eulota elegantissima* var. *cara* Pils. Riukiu.
 Fig. 7. *Mandarina mandarina* var. *trifasciata* Pils. Nakano-shima, Ogasawara.
 Fig. 8. *Fametesta mirabilis* Pils. Hahajima, Ogasawara.
 Fig. 9. *Hirasea profundispira* Pils. Chichijima, Ogasawara.
 Fig. 10. *Hirasiella clara* Pils. Chichijima, Ogasawara.
 Fig. 11. *Cyclophorus hirasei* Pils. Oshima, Osumi.
 Fig. 12. *Pupinella oshimae* Pils. Oshima, Osumi.
 Fig. 13. *Ganesella largillierti* Phil. Riukiu.
 Figures 8, 9, 10, 12 are enlarged, the others are natural size.



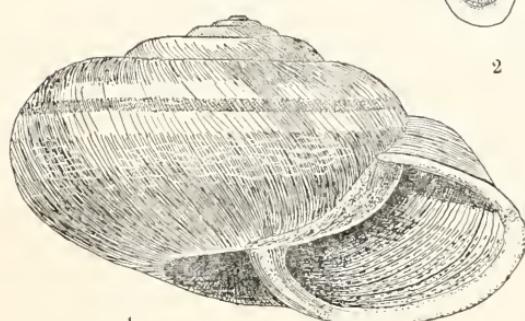
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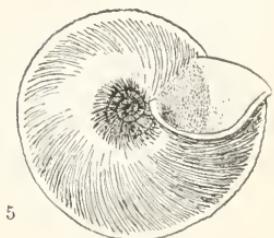
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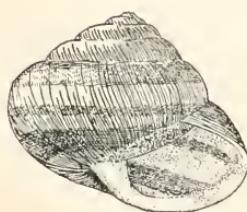
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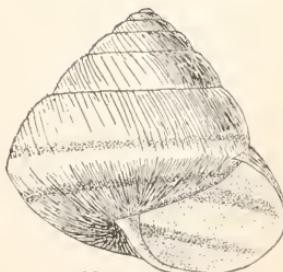
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11



12



13

JAPANESE LAND SHELLS.

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